Croplife®

A BUSINESSPAPER FOR THE FARM CHEMICAL INDUSTRY

MEMBER, BUSINESS PUBLICATIONS AUDIT

BPA

A Miller Publication
Business Journalists Since 1873

Vol. 8 AUGUST, 1961 No. 8

Featured in This Issue:

Capital Comments
By John Cipperly
Page 2

☆

Metal Storage Facilities Used by Kansas Plant
Page 18

☆

Future Prospects Good for Greater Pesticide, Fertilizer Use
By W. N. Thompson
Page 25

☆

Is Term 'Complex' Fertilizer Better than 'Mixed'?
By T. P. Hignett
Page 10

☆

New Fertilizer Law in Texas Revises Terminology
Page 35

☆

Pesticide Situation for 1960-61
By Dr. H. H. Shepard
Page 7

☆

Texas Pesticide Firm Enjoys Big Increase in 1961
By Jess F. Blair
Page 6

Regular Departments

Men Moving Ahead 4
What's New 14
Letters to the Editor 20
Agronomic Briefs 28
New Process Patents 30
Editorials 42
Meeting Memos 43
Classified Advertising 43
Gloomicides 43

Accepted as a Controlled Circulation Publication at Minneapolis, Minn.
Published Monthly by The Miller Publishing Co.
P. O. Box 67, Minneapolis 40, Minn.

Subscription Rates:
$5 for 1 year; $8 for 2 Years
Single copies 50¢

In-Plant Losses of Fertilizer Materials More Than Merely Nitrogen, Survey Shows

By Dr. Vincent Sauchelli
National Plant Food Institute
Washington, D.C.

SIGNIFICANT shrinkages not only of nitrogen, but also of phosphate and potash in manufacturing operations, are reported in a summary of the survey taken by the National Plant Food Institute in recent months. Operators of granular units in particular, report losses as a rule heavier than those incurred in making non-granular fertilizer products.

The NPFI survey indicated wide variances in the amounts of shrinkage in plants, due largely to differences in formulating practices. However, because of high analysis products generally being made, losses of any degree are regarded as being costly.

Allowances for losses averaging about 3.4% of the total nitrogen guarantee were reported by operators as being "intentional," in order to compensate for formulated free ammonia nitrogen loss, or to over-formulate as a safeguard against deficiency. Another 1.5% loss was reported as being unintentional, with losses coming from fumes, dust, leakage in lines, overweight at time of packaging, and moisture losses.

Other facts included the following:

Dust losses contribute only a minor part to the over-all material loss in granular as compared with non-granular plants. This is indicated in the data relating to phosphates and potash which must be lost as dust in dryers, coolers and ammoniators.

In non-granular plants the over-all loss in phosphate and potash averaged 2.15%; in granular plants, phosphate average losses amounted to 2.85% and potash losses to 2.54%. Apparently the major problem in granular plants is concerned with losses in nitrogen chiefly as ammonia, smoke and fumes.

Plants and companies vary widely in reported losses, particularly with respect to nitrogen, due largely to differences in formulating policies: These involve use of higher percentages of anhydrous ammonia versus solutions and solids and higher rates of ammoniation of phosphates.

Turn to **SHRINKAGES** page 2

PESTICIDE OPERATION—Pesticide volume keeps growing for Southwest Sprayer & Chemical Co., Waco, Texas. In above picture, Tony Groves, plant superintendent, operates lift truck as he loads drums for delivery to one of the firm's retail dealers. Story on Southwest Sprayer operation appears on page 6 of this issue.

CAPITAL COMMENTS

'61 Program May Give Plant Food Trade Demonstration On How Fertilization Pays

By John Cipperly
Croplife Washington Correspondent

WITH most domestic affairs now being administered by the Kennedy Administration in a political orbit, most industries including the makers of fertilizers and pesticides, find themselves in a mood of uncertainty but not necessarily of despair.

However, the agricultural chemical industry has possibly found itself in the middle of an administration at USDA which has a fixation on political emphasis rather than economic. Where and how far down this political avenue the Kennedy leadership may go remains to be developed, but there are many observers who believe that examples thus far indicate increasing strength of farm co-operatives in the area of government financing and expansion widely into other segments of business.

The enactment of a feed grain program, a radical departure from the administrative philosophy of Ezra Taft Benson, former secretary of agriculture, has provoked specific uncertainties in the chemical industry. This uncertainty surrounds the question of how far this administration may go in cutting back production of the crops in heavy surplus.

There seems to be no generally accepted definition of "surplus" except the political one which ascribes the low prices of commodities to the presence of surpluses. The Kennedy administration farm policy is designed to remove surpluses which cost the government large sums of money both for storage and for moving these commodities into export channels. The latter exchange is for soft foreign currencies which may never be redeemed by the foreign recipients.

These disposals under provisions of Public Law 480 for export are now euphemistically termed "food for peace programs," thereby attempting to justify the sales terms of these government-owned commodities. Use of this phrase also makes sentimental reading for the taxpayer who is footing the bill.

It is no doubt true that this country owns substantial stocks of bread and feed grains in excess of current domestic demand. These are dubbed "burdensome surpluses" by USDA economic philosophers.

But the USDA politicians and those on capital hill, sometimes refer to surpluses as weapons to combat the rise of communism in the needy underdeveloped nations. Thus, while USDA politicians shout from the house tops decrying the accumulations of surpluses in one breath, they delight in consumating export programs with foreign nations over long periods, involving huge quantities of farm products. Such commitments can be assumed only if we have at the time adequate supplies—surpluses if you will—to make good our contract obligations.

Therefore, a considerable number of observers believe that the new higher levels of price supports, plus the generous payments for land retirement, are somewhat of a contradiction with the foreign aid contracts now being undertaken.

The accumulations of grains now held by CCC, inspired by previous higher price support levels, frighten the uninformed public. But to the knowledgable observer, such reserve stocks are a necessity in an uncertain world. This nation has been blessed for nearly a decade with ideal weather for producing crops. No one can forecast when a sustained drouth or other calamity could hit the Corn Belt and make these so-called "burdensome" surpluses vanish quickly.

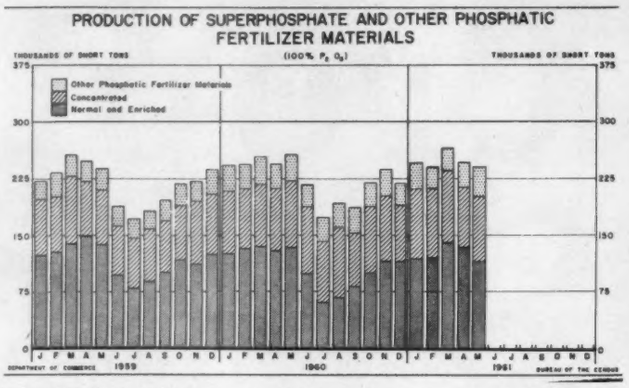
Uncertainty in the minds of fertilizer industry leaders rises somewhat obliquely from the above reasoning. In many respects, the 1961 program has been little more than a demonstration plot on a national scale, focusing attention on the major benefits realized from the use of fertilizer. The acreage retirement program is reported to have caused participating corn farmers to use cash advances received from the government to purchase increased quantities of plant food products to apply to land remaining in production of corn. Substantial increases in yields are now being forecast for the corn crop this year, assuming favorable growing weather continues through August.

If the feed grain program has done nothing else, it appears to have been highly successful as an excellent example for corn farmers to see. It is obvious to all that great gains can be obtained from adequate use of fertilizers. Such a wide spread example, if financed by the industry alone, would have been prohibitive in cost, and would have had to be maintained for a long time.

Thus, the feed grain program may ultimately be seen by the fertilizer trade as an unexpected blessing. However, its results may bedevil the architects of the supply-management control theory. If such a policy were to continue indefinitely, it is conceivable that as use of fertilizer materials approached the optimum on all corn farms, it would become necessary each year for USDA to order even deeper cutbacks in acreage.

The fertilizer industry in its success in promoting adequate and optimum use of fertilizer is making a significant contribution to the farm

Turn to GRAIN PROGRAM page 38


PRODUCTION OF SUPERPHOSPHATE AND OTHER PHOSPHATIC FERTILIZER MATERIALS
THOUSANDS OF SHORT TONS
(100% P_2O_5)
THOUSANDS OF SHORT TONS
Other Phosphatic Fertilizer Materials
Concentrated
Normal and Enriched
375
300
225
150
75
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1959
1960
1961
DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

PRODUCTION DIPS—Output of superphosphate and other phosphatic fertilizer materials in May, 1961, was down slightly from production during the corresponding month of 1960. The figure for May, 1961, was 240,138 tons against 254,914 tons the previous year. Shipments were also down, and stocks held by producing plants were up. Shipments totaled 149,141 tons in May this year, down 19% from the same month of 1960. Stocks held by producers were up 13% more than were on hand at the end of April this year. The above figures were prepared by the Bureau of the Census, U.S. Department of Commerce.

NPFI Survey Reveals In-Plant Shrinkage Greater Where Granular Products Are Made

By Dr. Vincent Sauchelli
Chemical Technologist
National Plant Food Institute
Washington, D.C.

(Continued from page 1)

Based on the reports in the survey, granulating plants lose on average from 4% to 6% of the nitrogen; 2% to 4% of the phosphate; and 2% to 3.5% of the potash input. Plants producing non-granular fertilizers lose on average from 1.5% to 3% of the nitrogen; 2% to 3% of the phosphate and 2% to 3% of the potash input.

Dale C. Kieffer, Smith-Douglass Co., Norfolk, Va., member of the task force on in-plant shrinkage, commented on the situation as follows:

"The TVA type continuous ammoniator is extensively used in granulating plants, but it apparently has not been incorporated in many production units turning out only pulverized fertilizer. In granular plants it is used both as an ammoniator and a granulator. Since nitrogen losses are greatest in plants producing granular fertilizers, it could be reasoned that the old batch mixers are still the most efficient.

"This is hardly a fair assumption because more liquid, particularly anhydrous ammonia, is introduced along with acids in the granular plants to produce heat, and aid in granulation. The conditions most favorable to granulation are not always ideal for best ammonia absorption. In general, this possibility is the most important reason for the difference of about 2.5% more nitrogen loss in the granular plants as compared to the batch mixing operations.

"Under similar conditions the TVA type ammoniator undoubtedly would compare favorably—and possibly show a slightly higher efficiency—than the batch mixer.

"Apparently, the operators of granulation units anticipate higher nitrogen losses because most companies reported allowances in their formulas which, on the average, amounted to about 3.4% of the total nitrogen guarantee as an anticipated loss. This leaves only 1.5% nitrogen loss that is unintentional and, to a large measure, unexplained.

"Based on the reports of companies cooperating in the in-plant shrinkage survey it would seem that dust losses contributed only a minor part to the over-all material loss in granular plants as compared to non-granular operations. The basis for this conclusion is found in the figures pertaining to phosphates and potash.

"Both of these plant foods must be lost from the dryers, ammoniators and coolers as dust. In non-granular plants the over-all loss in phosphate was 2.74% and potash was 2.15%. In the granular plants phosphate losses amounted to 2.85% and potash losses 2.54%. From this, it is quite apparent that the major problem in the granular plant centers around nitrogen losses—largely as ammonia, smoke and fumes.

"I have been quoting averages and it should be emphasized that there is a great deal of variation between plants and companies, particularly with respect to nitrogen recovery. Some of these differences may be due to variations in over-all efficiency of operation, but probably more of it is due to differences in formulating policies, that is, the use of higher percentages of anhydrous ammonia versus solutions and solids—and higher ammoniation rates on the phosphatic materials.

"It must be expected that the phosphate losses will exceed the potash losses to some extent because, in addition to handling and dust loss on phosphates, there is the additional possibility of conversion of available P_2O_5 to citrate insoluble forms. Apparently, there is slightly more reversion in the plants producing pulverized fertilizer than in the granular plants, but the difference is relatively insignificant. About .3% to .5% of the P_2O_5 loss is due to reversion.

"With the exception of nitrogen losses at the ammoniator, substantially all of the shrinkage at the various points of manufacture is in the magnitude of a fraction of a percent. However, these small fractions can still add up to a significant cost.

"Based on the information submit-

Turn to SHRINKAGE page 39

N P_2O_5 K_2O

12-12-12 16-8-8 14-0-14 15-10-10 20-10-10 12-12-12 16-8-8 14-0-14 15-10-10 20-10-10 12-12-12 16-8-8 14-0-14 15-10-10 20-10-10

Ammonium Sulfate . . . is the material which will help you produce better-conditioned mixed fertilizers at a faster rate of production. We suggest you use Ammonium Sulfate for *more* of the "top units" of nitrogen in your formulations. A dry, well-conditioned fertilizer stores better and drills better. This means more savings for you and your fertilizer customers. Your best source of dry nitrogen for mixed fertilizers is USS Ammonium Sulfate. It's 21% nitrogen and free-flowing. USS Ammonium Sulfate—a product of United States Steel—is available whenever you need it from several plants located to serve you efficiently. Contact your USS Ammonium Sulfate representative or the USS Chemicals sales office nearest you: Pittsburgh, New York, Chicago, Salt Lake City or Fairfield, Ala.

USS TRADEMARK **Ammonium Sulfate**

MEN MOVING AHEAD
In The Trade

R. L. Tilton

E. C. Abbot

L. P. Massari

M. M. McCaslin

R. L. Tilton has been promoted to general sales manager of the nitrogen products Division of W. R. Grace & Co. and will be in charge of all sales of ammonia, urea and solutions. His office will be at Memphis, Tenn. He succeeds **F. J. Ronan,** recently elected vice president in charge of marketing for the division. Prior to joining Grace, two years ago, Mr. Tilton was with Olin-Mathieson Chemical Corp. This promotion was announced by **William J. Haude,** president of Grace's nitrogen products division. He also announced additional executive promotions:

J. L. Wilson

L. P. Massari has been made assistant general manager, with headquarters in Memphis. In addition, Mr. Massari will continue to serve as urea product manager and export manager. Mr. Massari joined Grace in 1955.

E. C. Abbot has been named manager of retail ammonia sales for the nitrogen products division, and will be located in Memphis. Mr. Abbot joined W. R. Grace in 1955.

J. L. Wilson has been named to succeed Mr. Abbott as general manager of Sangamon Grace Ammonia Co., Decatur, Ill. He joined Sangamon Grace in 1959.

M. M. McGaslin was made sales manager of the St. Louis district of the nitrogen products division, succeeding Mr. Tilton. Mr. McCaslin has been a special sales representative in the Midwest for Grace. His office will be in St. Louis.

●

Michigan Chemical Company of Niles, Michigan announced today the appointment of **Ronald E. Bodtke** to position of district manager. Mr. Bodtke attended Michigan State University. He served two years in the U.S. Army. He was formerly employed by Smith-Douglass Co.

Ronald E. Bodtke

Mr. Bodtke will service farm supply dealers and growers in Southern Michigan.

●

Thompson-Hayward Chemical Co., Kansas City, Mo., has announced the appointment of **Clarence D. Holthaus** as general manager of its Rocky Mountain Territory in Denver, Colo. Mr. Holthaus was formerly branch manager of the company's Laundry and Dry Cleaning Supply Division in Denver. In his new positon, he will be responsible for Thompson-Hayward's entire chemical activities in Colorado, New Mexico, Wyoming and Montana.

●

Ortho division of California Chemical Co., Richmond, Cal., has announced a number of recent appointments to cover various responsibilities in its sales field, production facilities, and management posts.

William M. Miller has been appointed plant manager at Calchem's new plant food facility at Ft. Madison, Iowa, according to a recent announcement by **Howard J. Grady,** president, Ortho division. Mr. Miller will supervise operation of the anhydrous ammonia plant, the ammonium nitrate plant, nitric acid and complex pelleted fertilizer plant.

James E. Spaulding has been made chief plant engineer at Ft. Madison; **Gayle H. Nichols, Jr.,** operating foreman; **William R. LaHaye,** supervisor of employee relations and organization; **James L. Welty,** plant buyer; and **Joseph L. Roye,** traffic representative.

Appointments of three agronomists have been announced by **Dr. Malcolm H. McVickar,** chief agronomist of Calchem. **William W. Wagner** was named agronomist with headquarters at San Jose; and **George R. Hawkes,** was made Western Regional agronomist, with supervision of agronomic research in the eleven Western states.

Robert E. Warnock was appointed Northern Regional Agronomist. He will direct agronomic field research in the 23 northern states served by the new Ft. Madison plant.

Sales representatives recently appointed include **Richard C. Messer** who will work in the El Centro area of California, and **William G. Johnson,** who will represent the company in the West Texas area. These announcements were made by **C. M. Crutchfield** and **Gordon Black,** Dallas district manager and Southern California district manager, respectively.

●

The promotion of **G. F. Stegall** to east central regional manager for the agricultural division of American Cyanamid Co. has been announced by **E. H. Smythe,** divisional marketing director. Mr. Stegal replaces **Dr. M. J. Harvey,** now animal feed products supervisor.

Mr. Stegall, formerly assistant regional manager for the southeast region, joined Cyanamid in 1947 as a sales representative. He is a graduate of the University of Tennessee.

Dealer Training Services
Exclusively for
Fertilizer Selling
WHAT'S
FROM
NOW – Full Orbit embraces an entirely new and bigger area of customer service. This service is specifically designed to help you increase your sales through your dealers. It includes not only assistance for your own salesmen but assistance for your dealers' salesmen. Ask your IMC representative to show these services the next time he calls.

Loyal E. Ramsey has been appointed manager of the Butler, Pa., plant of Central Chemical Corporation, Hagertown, Md. Mr. Ramsey formerly was employed by the feed division of General Mills, Inc. Central Chemical Corp. is a manufacturer of fertilizers, insecticides and feeds.

●

Raymond Bag Corp. has announced that **E. E. Heydt** has been assigned to represent the company in the Michigan, Northern Indiana and Ohio sales area. He was previously connected with Raymond's Chicago office.

●

C. E. "Bill" Brissenden has been appointed assistant sales manager of the minerals & Chemical division of J. R. Simplot Co., Pocatello, Idaho, **Ben D. McCollum,** sales manager, has announced.

Mr. Brissenden has been with Simplot nine years; the last four of which he was in charge of Division Market Development.

Simplot has also announced the appointment of **Donald B. Holzer** as sales representative for Oklahoma and Texas.

●

Smith-Douglass Co. has appointed **Charles R. Hoefs** as fertilizer sales representative in southeastern Wisconsin. The announcement of Mr. Hoef's appointment was made by **M. W. Mawhinney,** manager of the Streator, Ill. plant of Smith-Douglass Co. Mr. Hoefs is a graduate in soils from the University of Wisconsin and will make his headquarters at F't. Atkinson, Wis.

Chas. R. Hoefs

●

Allen Hoffman has been appointed to manage the $8 million anhydrous ammonia plant being built at Hastings, Neb. by Consumers Co-op Assn. Mr. Hoffman has been with the co-op since his graduation in 1948 from Kansas State University.

●

Spencer Chemical Company has announced changes in and additions to its financial and corporate officers. **John C. Denton,** president, said that the new corporate titles, are designed to identify the functions and responsibilities of these officers.

John P. Miller has been made executive vice president in charge of financial affairs of the company; **Eugene W. Morgan** was elected vice president and treasurer; **James A. Borders** was elected secretary; **Hubert F. Crawley** was elected controller; **Joseph R. Hughes,** assistant treasurer and **James G. Dieter,** assistant secretary.

Mr. Miller has been associated with Spencer since 1943; Mr. Morgan for the past 15 years; Mr. Borders since 1954; Mr. Hughes since 1947; and Mr. Dieter since 1953.

Harry W. Walker

Don R. Russell

The bag division of St. Regis Paper Co. has named **Harry W. Walker** director of operations (sales) for a newly formed Great Lakes-Gulf area which includes territory from the Great Lakes, through the Ohio Valley, and south to the Gulf of Mexico. Mr. Walker will make his headquarters in the company's Chicago office.

Wm. S. Doolan

Don R. Russell has been appointed to succeed Mr. Walker at Columbus, Ohio as sales manager of the Ohio Valley region. Mr. Russell will headquarter at the company's New York office.

Mr. Walker also will be assisted in the new Great Lakes-Gulf Area by **William A. Harris,** who will continue as sales manager of the Chicago region, and **John B. Brent,** in the Southern region with headquarters in Birmingham, Ala.

Charles A. Woodcock, who continues as director of operations (sales) for the Eastern Area, with headquarters in New York City, will be assisted by four newly appointed regional sales managers: **William S. Doolan,** sales manager of the newly formed South Atlantic region, with headquarters in Savannah, Georgia; **Robert E. Harrison,** Mid-Atlantic region, Baltimore; **William T. Orr,** Northeastern region, New York City; and **William H. Versfelt,** metropolitan New York region.

●

Appointment of **Scott Mabry** as a district manager for Mid-South Chemical Corp. with headquarters in Memphis, has been announced by **D. H. Bradford Jr.,** vice president.

Scott Mabry

Mr. Mabry, an agronomist, has been assigned to Eastern Iowa and Western Illinois district for Mid-South Chemical Corp. His home will be at Alexis, Ill.

Mid-South is an affiliate of Cities Service Co. and Continental Oil Co.

●

R. B. Korsmeier has been named manager of the Sales Planning, Development and Education section of The Dow Chemical Company's agricultural chemicals sales department. His promotion was announced by **W. W. Allen,** sales manager.

R. B. Korsmeier

Mr. Korsmeier, formerly district sales manager for agricultural chemicals in Dow's Los Angeles office, succeeds **Hillard L. Smith** as SPADE manager. Mr. Smith was recently named assistant to the manager of Agricultural Chemicals Sales.

●

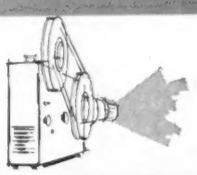
Henry F. Pierce has been appointed district manager of a newly formed midwest agricultural chemicals sales district of Hercules Powder Co. The new district covers fourteen

Turn to **MOVING AHEAD** page 37

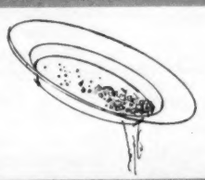
NEW! Dealer Training Meeting Package — This is a detailed description of how to conduct a successful dealer training meeting. It provides step-by-step information on proven sales techniques and offers favorable management assistance to the dealer. A strip film and scripts are specifically tailored to more profitable sales.

NEW! Maximum Yield Forms — A powerful but easily worked tabulation which your salesmen may use with your dealers to determine profit potential in the dealer's marketing area. It dramatically illustrates the maximum benefits offered the farmer.

NEW! Sul-Po-Mag Flash Cards — An excellent pocket-size item which your dealers may use as a reminder of Sul-Po-Mag's unique advantages. A set of 20 cards gives your dealers' salesmen the entire Sul-Po-Mag story in a convenient manner.



NEW! Training Film List — Contains a listing of important films compiled from the library of IMC, U.S. Department of Agriculture and the National Plant Food Institute. Each of these films has been selected for its pertinence to the sales problem.



NEW! Prospecting Procedures — Systematic procedures for analyzing your fertilizer market, securing new prospects, and then developing these prospects into new customers.

Farmer-Dealer Meeting Kit — The proven practical, planned way for holding successful farmer-dealer meeting. Step-by-step description includes programming, location, notification, equipment requirements, product information, group participation techniques, and other important subjects.

Let's Makes Sales Today — A detailed procedure for increasing fertilizer sales now. It includes telephone selling technique, using credit as a sales tool, and interview-canvassing procedure that practically guarantees successful results.

IMC FULL ORBIT SERVICE

How to Get These Dealer Training Services — Simply ask your IMC representative or write direct to:

Mr. E. C. Horne, Sales Manager
Materials Department
International Minerals & Chemical Corp.
Skokie, Illinois

FO-1-2

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Agricultural Chemicals Division, Materials Dept. • Administrative Center • Skokie, Illinois

IMC

PLANT OFFICIALS—Dr. Charles Meadows, left, founder and president of Southwest Sprayer & Chemical Co., Waco, Texas, and Amos Priddy, sales manager, direct production and sales activities of this progressive company. Dr. Meadows holds a M.S. degree from Louisiana State University, and earned his Ph.D. from Ohio State University.

Texas Pesticide Firm Enjoys Big Increase in 1961 Season

By Jess F. Blair
Special Croplife Writer

SOUTHWEST Sprayer & Chemical Co., Waco, Texas, is expecting a 30% increase in the sale of insecticides for 1961, mostly because the cotton allotment had been raised 6%.

"We have averaged a 16% increase each year since the plant was opened in 1953," said Dr. Charles Meadows, president of the firm. "The extra cotton acreage should almost double that rate of increase."

The company is closely allied with the cotton industry. It now formulates several kinds of insecticides and operates a cotton delinting plant. This provides year-around work for most of the employees, because when insecticide sales stop in Stepember the delinting plant opens a month or so later and lasts through much of the winter. These two jobs plus a constant maintenance program enables Southwest to maintain a staff of regular workers.

The insecticide plant employs from eight to ten workers under the supervision of Tony Groves, who has received national recognition for his work. Some of the products formulated are toxaphene, aldrin, DDT and parathion, and all carry the company's "Southwest" brand.

Ingredients are brought in by truck and rail, but mostly the finished product is shipped to dealers by company trucks. The firm uses two main sizes for the liquid insecticides—a 55-gallon drum and a five-gallon size. In the early part of the season, the larger sizes are used almost altogether. When the insect populations begin to taper off in late summer, the demand is mostly for the five gallon cans.

In addition to producing cotton crop insecticides, the Southwest Sprayer & Chemical Co. is a distributor for herbicides, weed killers, cattle sprays, and handles all types of sprayers and parts.

"We are gradually becoming more diversified," said Dr. Meadows. "We can use the same personnel and thus save on overhead. Also the cotton farmer who buys insecticides from us will also need a sprayer and weed killers."

The company stresses selling as the most important factor of the business. And in striving for more sales, it has been using a plan for extensive field service. Dr. Meadows says he will usually have three men in the field as compared to only one for each of his competitors. His theory is that farmers in the Texas Blacklands must strive for greater production or quit growing cotton. To assist in this, the company's head entomologist, Sam Goolsby, holds many group meetings at dealers' stores and in the field. He uses such tools as movies, film strips and actual specimens of insects.

Ordinarily the company employs from 15 to 18 student entomologists in addition to Mr. Goolsby. After two weeks of intensive training, they are assigned certain areas and work with one of the company's retail dealers.

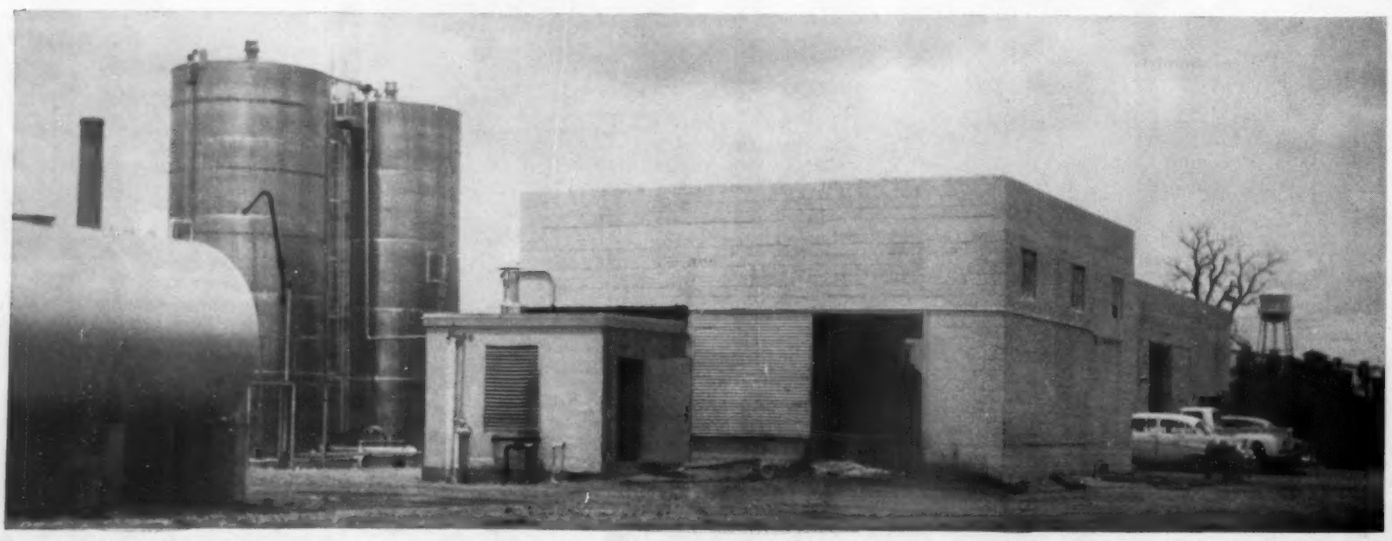
"We are now using a few agronomists also," said Dr. Meadows. "We are striving for greater production, and insect control is only one of several factors. Better seed, cultivation, fertilization and other problems are areas where we can help the farmer."

The company has learned that farmers are too busy to keep up with the fast developments in agricultural chemistry, so much of the educational work is done with dealers. Dr. Meadows says that only a very few farmers can make insect counts, so he keeps a staff of entomologists to do it for them. Though this field service has increased the payroll, he thinks it has been mainly responsible for the 16% yearly increase in sales.

Concerning the future, Dr. Meadows has some well-developed theories of his own. "I think the tendency for major companies to buy small plants will continue," he said. "The cost of operation is rising steadily with all companies. At present a major company must spend from $2,000,000 to $5,000,000 to put a new chemical on the market.

"I believe there will be a place for the small plant owner, if he will learn how to promote and sell. His facilities will still be used for formulation, but he must equip himself to become a member of a team. Our biggest break-through will come in the merchandising end of the product. Teaching farmers what they need and how to use it for higher profits—that is the biggest problem today. Why, if every farmer used all the fertilizer, pesticides and other chemicals he needed, the industry would achieve a phenomenal increase in production and sales."

TEXAS PLANT—Exterior view of Southwest Sprayer and Chemical Co. building at Waco, Texas. Principal customers for firm's pesticidal products are cotton growers in the area.



Annual Pesticide Situation . . .

Production and Use of Pesticides Increase In 1960-61, Annual USDA Report Indicates

New record for DDT production in 1961 regarded probable after 16-million-lb. output in March . . . BHC production also up in 1960-61, as is methyl parathion. Production of fungicides and herbicides reported increasing. Exports remain high.

PRODUCTION and disappearance of many pesticides were higher in 1960 and the early portion of 1961, than they were the previous year, according to information contained in "The Pesticide Situation for 1960-61" issued this month by the agricultural chemicals staff of the Agricultural Stabilization and Conservation Service, Food and Materials Division, USDA. Dr. Harold H. Shepard was in charge of the project.

DDT production in the U.S. during 1960 amounted to 163,582,000 lbs., marking the third successive year that it has been higher than the previous year.

Production for the first four months of 1961 was 58,895,000 lb. In March it was the highest on record, 16,048,000 lb., indicating a possible annual U.S. capacity of nearly 190 million pounds.

Exports of DDT last year amounted to 98,964,000 lb., of which 86,530,000 lb. were in the form of 75% wettable.

During the first three months of 1961, DDT exports were 37,599,000 lb. of which 35,297,000 lb. were 75% material.

BHC

Although domestic disappearance of benzene hexachloride (gamma basis) was slightly higher in 1959-60 (5,111,000 lb. compared with 4,276,000 lb.), U.S. production for the calendar year rose to 6,900,000 lb. In 1959 it was 5,500,000 lb.

Production for the first four months of 1961 was 3,687,000 lb. Carryover of BHC by primary producers at the end of the 1960 season showed a marked reduction of higher gamma material and a significant increase in low gamma.

Of total U.S. exports, amounting to 2,989,000 lb. gamma-BHC, 2,208,000 lb. went to Brazil, largely for the anti-malaria program there.

Combined production of aldrin, chlordane, dieldrin, endrin, heptachlor, and toxaphene changed little from a year ago. Inventories remained about the same, and exports by the primary producers differed little from the quantity shipped in 1959. Of "polychlor" exports in 1960, Egypt received 17% (or 8,277,000 lb.); in February and March, 1961, however, the U.S. shipped 12,106,000 lb. of these materials to Egypt out of a total of 16,889,000 lb. for the two-month period.

Table 1.—U.S. Production of Some Major Pesticidal Chemicals by Calendar Years, 1958-1960

Chemical—	1958 1,000 lb.	1959 1,000 lb.	1960[1] 1,000 lb.
Aldrin-toxaphene group[2]	98,280	86,868	90,671
Benzene hexachloride (gross)[3]	30,797	27,574	37,444
Benzene hexachl'ide (gamma equiv.)[3]	6,500	5,500	6,900
Calcium arsenate	10,432	6,424	[5]
Copper naphthenate	1,853	1,887	1,893
Copper sulfate	97,192	80,584	116,000
2,4-D acid	30,944	29,282	36,185
2,4-D acid esters	21,938	24,672)	
2,4-D acid salts[4]	2,964	2,749)	34,031
DDT	145,328	156,741	163,582
Ferbam	[5]	[5]	2,434
Lead arsenate	14,938	12,904	[5]
Methyl bromide	10,224	11,193	11,264
Methyl parathion	5,018	5,987	11,794
Nabam	[5]	3,350	2,978
Parathion	5,439	9,180	7,448
Pentachlorophenol	35,177	38,814	39,336
Phenyl mercuric acetate	1,056	943	[5]
Sodium chlorate	134,498	176,600[6]	182,368
2,4,5-T acid	3,678	5,547	6,337
2,4,5-T acid esters and salts	5,230	8,033	7,924
Ziram	1,178	757	982

[1]Preliminary.
[2]Includes aldrin, chlordane, dieldrin, endrin, heptachlor and toxaphene.
[3]Includes lindane.
[4]Sodium and amine salts.
[5]Figure not available.
[6]Revised figure.
Sources: U.S. Tariff Commission; U.S. Bureau of the Census; U.S. Bureau of Mines; chemical industry.

Parathion

Parathion production dropped from the 1959 level of 9,180,000 lb. to 7,448,000 lb. in 1960, while production of methyl parathion rose from 5,987,000 lb. to 11,794,000 lb.

Inventories of phosphorus insecticides in the hands of the primary producers of these materials Sept. 30, 1960 were 23% methyl parathion, 13% parathion, and 64% other phosphorus compounds.

Lead arsenate production has not varied much in the last six years, averaging 13 million pounds a year. Production of calcium arsenate in the same period jumped from 3,770,000 lb. in 1955 to 27 million pounds the following year because of the resistant boll weevil situation. Since then production has gradually fallen to under 5 million pounds in 1960, as usage for weevil control has lessened. Manufacturers' stocks dropped by the end of the 1960 season to one-half those at the end of the previous crop year.

Notwithstanding disturbed political conditions in central African countries, U.S. imports of pyrethrum flowers and extract were both at somewhat higher levels than the previous year. Their combined value amounted to $5 877,838 compared to $5,295,467 in 1959.

Fungicides

Producers of copper sulfate reported to the U.S. Bureau of Mines that in 1960 they shipped 33,280,000 lb. for agricultural, 40,024,000 lb. for industrial, and 35,240,000 lb. for other uses (chiefly export).

The U.S. Bureau of the Census reported 29,681,000 lb. exported in 1960, the difference due presumably to more material having left the producers' plants for export than had cleared customs by the end of the year. The only country to which the U.S. shipped more than a million pounds of copper sulfate in 1959 was Panama, which received 3,384,000 lb.

In 1960, four countries (Costa Rica, Guatemala, Honduras, and Panama) received a total of 26,492,000 lb. or 89% of the total U.S. exports for the year; this compares with 56 610.000 lb. shipped to these countries in 1957.

Herbicides

Over 50 million acres of agricultural land were treated chemically for weed control in 1959, more than double the area to which herbicides were applied ten years previously, according to a survey by the U.S. Department of Agriculture. Small grains led with 19,475,000 acres treated, costing $34,861,000 for herbicide and application. Corn was second with 16,127,000 acres treated at a cost of $31,222,000. Total cost of treating 50,452,000 acres was $136,743,000.

Sales of agricultural herbicides increased 7% in 1960 over 1959, according to a non-government survey. Pre-emergence products showed a 33% increase and post-emergence gained 11%. Off-setting these gains materially was a drop of more than 40% in use of chemicals to kill weeds and brush in pasture and non-crop areas. Appreciable gains in weed control in grain crops were reported also by the

Turn to PESTICIDES page 38

RUSSIAN SCIENTISTS SHOW TAINT OF CAPITALISM

Soviet industrial research laboratories are finding it no easy matter to compete with Russian universities for the services of scientists and technologists. So far the universities are leading in this race for talent—since they can pay a scientist three or four times as much as he could make doing research for industry.

These sidelights are revealed in a recent edition of the USSR's "Ekonomicheskaya Gazeta." A translation of the article from this paper is included in a collection of material from Russian sources on Soviet science today. (Available in English from the Office of Technical Services, Business and Defense Services Administration, U.S. Department of Commerce, Washington 25, D.C.)

"The proper organization of (scientific) labor," says an official of the Ukrainian Institute of Machine Engineering and Automation, is a matter to which the Institute devotes "considerable attention" since accelerated research can cut the time from drawing-board to production line. Concerned with the production of various "automatic instruments" for Soviet industry, the Ukrainian laboratory has a staff of some 350 scientists and technicians. "Unfortunately, however, the problems associated with the training—and particularly with the remuneration—of these specialists are still not resolved," the paper reports.

A doctor of science serving as the chairman of a university department makes three to four times more than he would working as the director of an industrial laboratory, according to the Soviet paper. "Is that proper?" asks the article, and answers its own question: "Of course not."

The paper sums up its discussion of "From the Institute to Production" with a plea for better cooperation between universities and Soviet industrial laboratories.

NAC Assn. Program Calls for Talk by Hon. Abraham Ribicoff at Fall Annual Meeting

THE INDUSTRY'S Challenge—Progress or Complacency?" will be discussed by speakers appearing on the program of the National Agricultural Chemicals Assn. convention at the Homestead Hotel, Hot Springs, Va., Oct. 29-Nov. 1. Speakers will include Hon. Abraham Ribicoff, Secretary of Health, Education, and Welfare, according to the NAC Assn. office, Washington, D.C.

The tentative program calls for an address by Dr. George R. Ferguson, president, Geigy Agricultural Chemicals, Ardsley, N.Y., and talks by Dr. Rowell, extension entomologist, Virginia Polytechnic Institute, Blacksburg, Va.; Miss Willie Mae Rogers, director, Good Housekeeping Institute, New York; and Dr. D. A. Spencer, research biologist, Wildlife Research Center, U.S. Fish and Wildlife Service, Denver, Colorado.

Luncheon speaker on Monday, Oct. 30, will be Dr. G. Herbert True, assistant professor of marketing at Notre Dame University, South Bend, Ind.

Mr. Ribicoff, Secretary of Health, Education and Welfare, Washington, D.C., will be speaker at the NAC annual banquet Tuesday night, Oct. 31, according to the preliminary program.

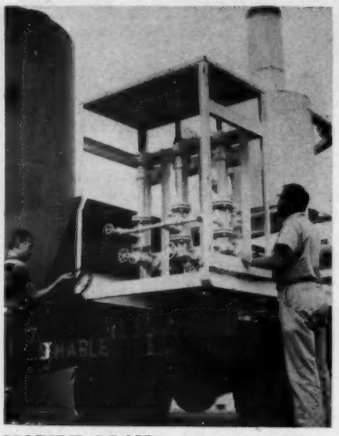
Wednesday, Nov. 1, will be devoted to reports by and discussions on the NAC staff, with an open forum scheduled for the morning program. Newly-elected NAC officers and members of the board of directors will be introduced at that time.

The program committee comprises P. J. Reno, Hercules Powder Co., Wilmington, Del., chairman; M. C. Van Horn, Florida Agricultural Supply Co., Jacksonville, Fla.; Dr. Richard H. Wellman, Union Carbide Chemicals Co., New York; Daniel J. Keating, Stauffer Chemical Co., New York, and Denis Hayley, director of information, NAC Assn., Washington.

Makes Market Study

Theodore Riedeburg, Theodore Riedeburg Associates, New York, was spending much of July and August in Europe making a study of pesticide requirements in Germany, Switzerland, France, Italy and the British Isles.

Mr. Riedeburg, marketing consultant, stated before departing for Europe, that his clients are eager to learn in greater detail about potentials there for marketing specialty products under current competitive conditions.



MOBILE PLANT—This fertilizer plant on wheels manufactures nitrogen-phosphate solution. Dubbed the "Thunderjug" because of its noisy, rumbling start-up, the reactor is built onto a truck which permits fertilizer suppliers to move it about a wide area, servicing growers with liquid material (8-24-0) where and when they need it. Designed by Monsanto Chemical Co., the device produces fertilizer solution by continuous process at double the rate possible through batch production. The low-cost material is said to be particularly suited for soils deficient in nitrogen and phosphate but containing ample potash.

Society of Agronomy Announces Meeting

The 1961 annual meeting of the American Society of Agronomy is scheduled for Nov. 27-30 in St. Louis, Mo. Headquarters for the meeting will be the Sheraton-Jefferson Hotel, with some meetings also being held at the Statler-Hilton and in the Bishop Tuttle Memorial Building, the ASA has announced.

An estimated 1,500 agronomists and associated scientists will attend this 54th annual meeting of the society, according to Dr. Matthias Stelley, executive secretary. More than 400 reports on crops and soils research will be presented. Meeting with the ASA as usual will be the Crop Science and the Soil Science Societies of America. Over-all membership of the ASA now totals 4,400.

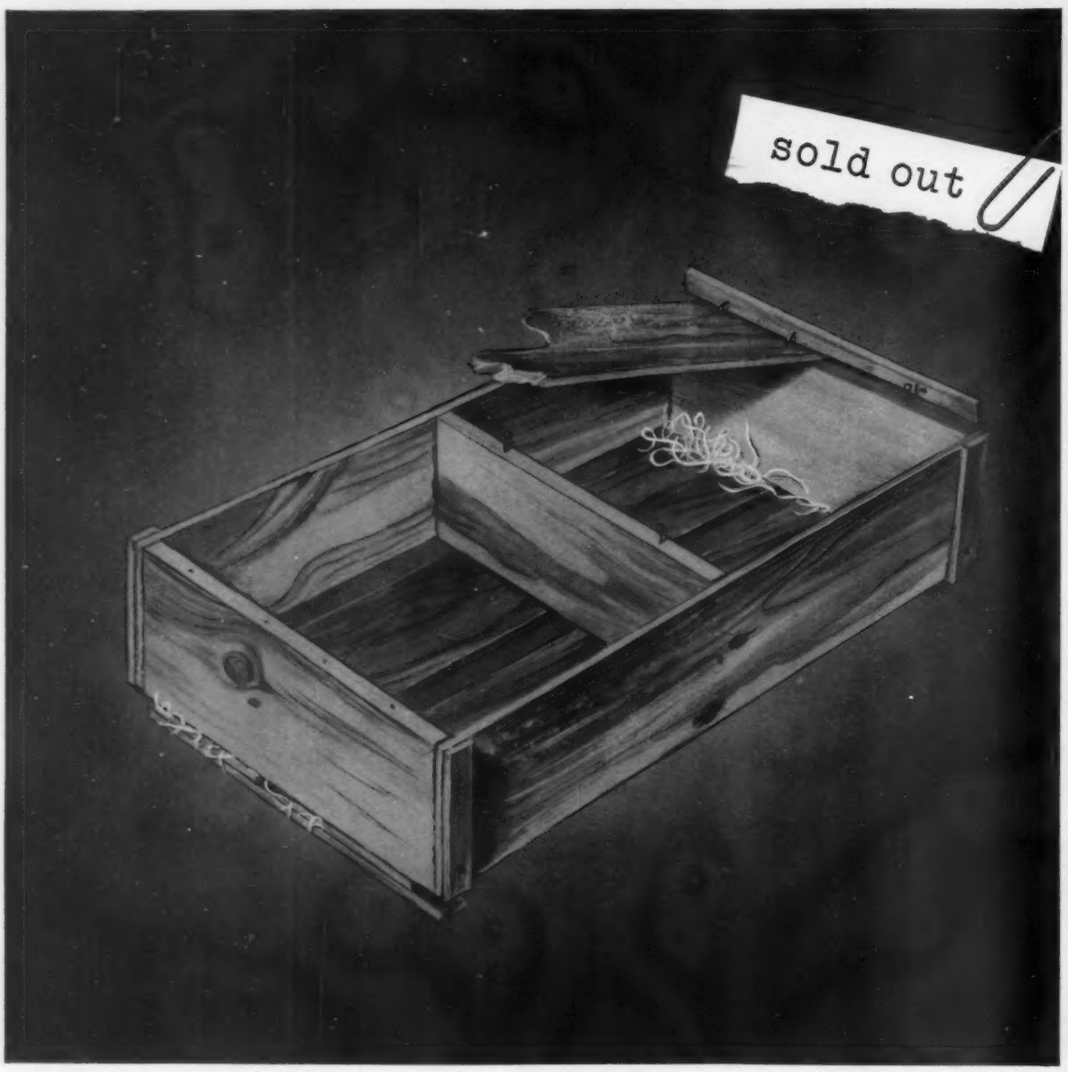
A feature of the 1961 meeting will be the 4th Conference on Agricultural Meteorology which is being sponsored jointly by ASA and the American Meteorological Society. Five sessions have been arranaged with a number of outstanding authorities on the programs. One special program will cover the response of field crops to light, temperature, water, carbon dioxide, and competition from other plants.

Another feature of the meeting will be special soil papers to mark the 25th anniversary of the Soil Science Society of America. Each of the seven divisions of the SSSA has arranged for a well-known soil scientist to keynote the progress and challenges in soil science. Also the Crop Science Society of America meetings will be a symposium on the effect of leaf area, light and food reserves on crop growth.

Other affiliated groups meeting with the ASA are the Council on Fertilizer Application, undergraduate students in agronomy, agronomic education specialists, extension agronomists, industrial agronomists and agronomists specializing in military land management.

Purchase Announced

Foster D. Snell, Inc., consulting chemists, have purchased the physical assets of American Scientific Supply, Inc., Long Island City, N.Y. The Snell organization will use the purchased firm's inventory in laboratories in New York City, Baltimore and Bainbridge, N.Y.



Because the fruit and vegetable crops were treated with

TRIANGLE BRAND COPPER SULFATE

Regular or basic copper sulfate should be mixed in insecticide-fungicide sprays and dusts to insure appetizing, attractive fruits and vegetables that consumers "reach for."

When used in fertilizers, Triangle Brand Copper Sulfate helps to enrich the soil, resulting in healthy, profitable crops.

Help your customers produce more profitable crops. Use regular or basic Triangle Brand Copper Sulfate in your fertilizer and insecticide-fungicide formulations... it will mean more money in your pocket!

phelps dodge refining corporation

300 PARK AVENUE • NEW YORK 22, NEW YORK

New National Committee on Pesticide Use Formed in Canada as Source of Information

Formation of a National Committee on Pesticide Use in Agriculture —a group qualified to deal intelligently with the growing use and misuse of pesticides—was announced in Ottawa, Canada July 26, 1961.

Recommended by the research branch of the Canada Department of Agriculture, the new committee will be headed by Dr. Henry Hurtig, of Ottawa, an associate director (pesticides) of the research branch.

Formation of the national committee stems from a proposal forwarded by the CDA's research branch to the National co-ordinating committee on agricultural services. Headed by S. C. Barry, deputy minister of agriculture, the co-ordinating committee is composed of the provincial deputy ministers of agriculture and the deans of the various Canadian agricultural colleges.

The national committee will:

1) Define problems in crop and animal protection and co-ordinate and stimulate research by Canadian agencies having an interest in the protection, through the use of pesticides, of livestock, fruit, vegetables and forage.

2) Summarize, interpret and make available current information on crop and animal protection materials and methods, including domestic and foreign regulations that have a bearing on their use.

In the latter case, such information will be compiled for use by research, extension and regulatory agencies—as well as the pesticide industry—as a basis for drafting detailed recommendations for pest control at the local level.

The committee will also be responsible for outlining a set of uniform principles to be employed in drafting local recommendations for pesticide use.

The committee will have four separate, but co-ordinated, sections covering livestock insecticide, fruit pesticide, vegetable pesticide and cereal and forage pesticide.

Its chief officers, in addition to Dr. Hurtig, will be Dr. R. A. Chapman, assistant director, Scientific Services, Food and Drug Directorate, Department of National Health and Welfare; C. H. Jefferson, chief of the Feed Fertilizer and Pesticide Section, Plant Products Division, Department of Agriculture, and L.A.O. Roadhouse, insecticide information officer, Research Branch, Department of Agriculture. All are drawn from agencies responsible for regulation of research, extension and the use of pesticides in Canada.

The Food and Drug Directorate establishes and enforces the residue tolerances for pesticides in human food, while the Plant Products Division of the Department of Agriculture administers the Pest Control Products Act which regulates the sale, advertising and labeling of pesticides.

Other members of the national committee have been drawn from various universities, provincial government agencies concerned with pest control, and the numerous research establishments of the Canada Department of Agriculture. The pesticide industry in Canada also has been invited to nominate technical experts to help the committee.

Spencer Acquires Two Packaging Supply Companies

Spencer Chemical Co. has announced the acquisition of all the outstanding common stock of two suppliers of packaging materials. Terms of the agreements were not disclosed.

Crystal Tube Corporation of Chicago and Flexicraft Industries, Inc., of New York will become wholly-owned subsidiaries of Spencer. These companies design, print and make bags from purchased polyethylene, cellophane, laminates, and other flexible materials for packaging uses.

J. C. Denton, Spencer president, described the move as a planned diversification into the flexible packaging industry, but added that Spencer has no plans to produce plastic films and the companies will continue to purchase their requirements for plastic films, cellophane, and other flexible constructions.

GRASSHOPPER INFESTATION

The worst grasshopper infestation since 1957 was reported early this month on the Oregon-Idaho border east of Baker, Ore.

Federal officials said that some 10,000 acres have been infested, with populations of from 25 to 30 per square yard reported.

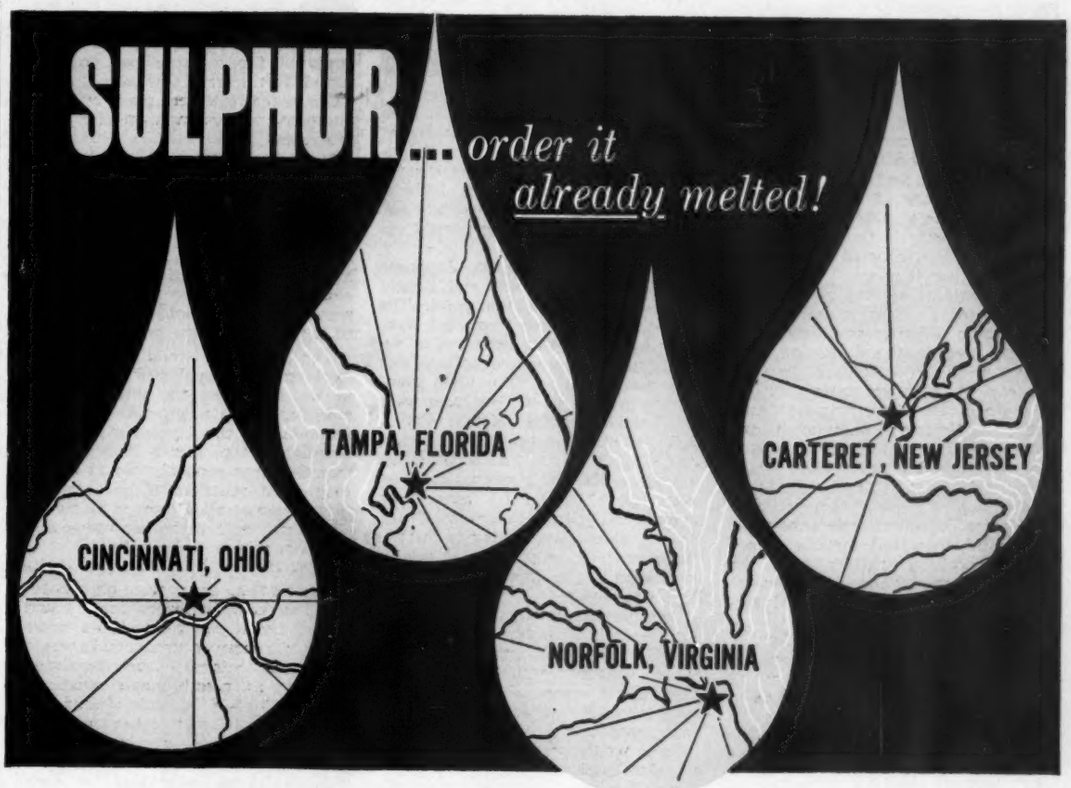
H. B. Busdicker, supervisor in charge of the regional plant pest control division, U. S. Department of Agriculture, said the grasshoppers did considerable damage in this area in 1957 and since then have been increasing every two years.

This year's invasion, he said, is the worst so far. The area includes Russell Mountain and Sugar Loaf in the high areas.

Entomologists took charge of aerial spraying operations against the pests.

WEEDS CAUSE LIVESTOCK DEATHS

EDMONTON, ALTA. — Poisonous weeds are likely to be responsible for more livestock deaths than usual this summer as dried up pastures may force animals to eat more weeds. Dr. H. N. Vance, veterinary pathologist with the Alberta Veterinary Service Branch, reports that one rancher in the province has already lost 18 head of cattle from hydrocyanic acid poisoning. Arrowgrass (goose grass) was found to be the cause of the trouble. In a normal year larkspur, water hemlock, death camas, and loco weeds are looked upon as the main potential killers in Alberta. However, because this is not a normal year in many parts of the province, Dr. Vance has warned farmers that weeds such as arrowgrass, flowering night shade, timber vetch and algae on ponds are all potential threats to livestock.



How far are you from Cincinnati—Tampa—Norfolk—Carteret?

Each of these TGS Regional Terminals carries several thousand tons of molten sulphur in storage—each has facilities for making prompt shipments by tank car or tank truck. If you are within economic shipping distance, we would plan to serve you from the regional terminal near you. If not, we can make prompt shipments from our large main Terminal at Beaumont, Texas where many thousands of tons of molten sulphur are in inventory at all times.

Our natural gas treating plants at Worland, Wyoming and Okotoks, Alberta where we recover Sulphur from H_2S are also in position to ship molten sulphur by tank car or tank truck to points in the Northwest and Western Canada.

Why not arrange to have your sulphur requirements delivered in molten form on a regular delivery schedule. We can supply you promptly!

In switching over to buying your sulphur molten rather than solid, you may wish information on how best to unload and handle it. We have a bulletin on this subject which we will be glad to send.

TEXAS GULF SULPHUR COMPANY
75 East 45th Street, New York 17, N. Y.
811 Rusk Avenue, Houston 2, Texas

Sulphur Producing Units: Newgulf, Texas • Moss Bluff, Texas • Fannett, Texas • Spindletop, Texas • Worland, Wyoming • Okotoks, Alberta, Canada

Author Asks Question . . .

Is Term 'Complex Fertilizers' As Explicit as Saying 'Mixed'?

By T. P. Hignett
Tennessee Valley Authority
Wilson Dam, Ala.

MOST FERTILIZER technologists agree that there is a need for improving fertilizer nomenclature. Our present system (if we may dignify our hodge-podge of poorly defined terms by calling it a "system") leaves much to be desired in accuracy, clarity, and uniformity of usage. We should welcome any new term that would help dispel confusion and avoid any new term that increases it.

The term "complex fertilizer" has been used rather frequently in European technical literature in recent years. More recently it has appeared in American literature a few times. Its usage has been discussed recently in business publications in both the United States and England. These articles questioned the usefulness of the term.

If the term "complex fertilizer" is to be useful, it should define to farmers, dealers, manufacturers, and scientists a class of fertilizers that differs in some significant way from other fertilizers. So the first step in considering the value of the term is to define what it means.

Before discussing the meaning of the new term, it seems desirable to define some of the present terms that will be used in the discussion. The term "mixed fertilizer" will be used to mean any fertilizer containing two or more of the three primary plant nutrients: Nitrogen, phosphorus, and potassium. The dictionary gives several definitions for "mixed," of which "formed by mixing" and "composed of dissimilar elements" are pertinent. The latter definition seem preferable as applied to mixed fertilizer since the composition, rather than the method of production, is the usual criterion for identifying mixed fertilizer.

Mixed fertilizers may be further classified as granular, nongranular, blended, or liquid. Granular mixed fertilizers are defined as composed of sized particles, usually within the range of 6 to 20 mesh, of similar composition; blended fertilizers are defined as mixtures of particles or granules of dissimilar composition. Thus, a granular 12-12-12 would be expected to consist of granules, each having a chemical composition reasonably close to the guaranteed analysis. A blended 12-12-12 might consist of separate granules of ammonium sulfate, ordinary superphosphate, triple superphosphate, and potassium chloride.

The definitions given above are intended to reflect common usage in the United States, although there may be some areas of disagreement. For instance, some ammonium phosphate sulfate fertilizers are sometimes considered to be straight materials rather than mixed fertilizers.

In searching for a definition for "complex" fetrilizers in the literature and by personal interviews, it was found that four definitions of complex fertilizer may be considered:

1. A mixed fertilizer in which the ingredients have reacted chemically with each other.
2. A mixed fertilizer in which a chemical reaction during mixing is a necessary part of the production process.
3. A mixed fertilizer that is manufactured by a process that does not involve the intermediate production of superphosphate.
4. A mixed fertilizer that is manufactured by a process that involves the reaction of nitric acid with phosphate rock.

A definition of complex fertilizer that is frequently offered is that the nutrient materials in a complex fertilizer are "chemically combined" rather than "simply mixed." This seems to be a naive version of definition 1 above. We know of no process by which common fertilizer materials can be "simply mixed" without chemical reaction. A great many samples of fertilizers have been examined by means such as X-ray diffraction or petrographic microscopy to determine what chemical compounds are present.

In all cases known to the author in which such examination has been made, evidence has been found that the ingredients have reacted chemically with each other. Often the reaction is so extensive that little if any of the chemical compounds initially present in the ingredients remain in the product.

A recent paper* by two Japanese scientists, Jumpei Ando and Seiichi Matsuno, illustrates the point. The fertilizers that were examined were made by granulating mixtures of superphosphate, ammonium sulfate, and potassium chloride. The main compounds present in the products were potassium syngenite, $K_2SO_4 \cdot CaSO_4 \cdot H_2O$; ammonium syngenite $(NH_4)_2SO_4 \cdot CaSO_4 \cdot H_2O$; monopotassium phosphate, KH_2PO_4; monoammonium phosphate, $NH_4H_2PO_4$; ammonium chloride, NH_4Cl; and calcium sulfate. Of the chemical compounds in the raw materials, only calcium sulfate was found in any appreciable amount in the products.

Perhaps the nearest approach to a nonreacting mixture would be a blend of separately granulated materials. However, even in such blends, evidence of chemical reaction has been found, sometimes with unfortunate consequences.

So it would seem that acceptance of definition 1 would result in classifying all mixed fertilizers as complex fertilizers. Probably many manufacturers woud agree that mixed fertilizers are indeed complex, but there seems to be little point in adopting a new name merely to advertise the complexity.

Definition 2 says that a mixed fertilizer is complex when a chemical reaction is a necessary part of the production process. This definition would clearly exclude blends of solid fertilizer materials but would include most other solid and liquid mixed fertilizers that are produced in the United States. The definition would include mixed fertilizers that are produced by processes that involve ammoniation of superphosphate which accounts for a large part of our mixed fertilizers. It would also include mixed fertilizers made by nitric phosphate and ammonium phosphate processes.

It might be difficult to classify fertilizers that are made by granulating a mixture of such ingredients as superphosphate, ammonium sulfate or nitrate, and potash salts without ammoniation. Since it is impossible to avoid chemical reactions in such processes, it would be hard to decide whether the reactions are necessary to the success of the process.

The definition could be modified to classify complex fertilizers as those in which it was the intent of the manufacturer to promote chemical reactions of the ingredients as distinguished from blends in which the manufacturer probably would prefer to prevent reactions if he considers the matter at all. However, this classification would be rather vague and not particularly meaningful.

Definition 3 would include nitric phosphates, ammonium-phosphate-based mixed fertilizers, and liquid mixed fertilizers, as well as some other less common products. It would seem also to include such unrelated products as nonphosphate mixtures (such as 16-0-16), blends of ammonium phosphate with other fertilizer materials, and mixtures in which the phosphatic ingredient is calcium metaphosphate, basic slag, or bone meal. The definition does not seem to be very useful.

Definition 4 has the merit of being more precise than the others. However, the terms "nitric phosphate" or "nitrophosphate" are well established, more descriptive, and less likely to be misunderstood.

Several years ago a paper (not published) was presented by James R. Lehr of TVA in which he gave results of microscopic examination of various nitric phosphate and other mixed fertilizers. The nitric phosphates were not more complex than the other fertilizers. One nitric phosphate, a 20-20-0 of foreign manufacture, was the least complex of those reported. It contained two major phases, dicalcium phosphate and ammonium nitrate; one minor phase, monoammonium phosphate; and one very minor phase, calcium fluoride.

It may be of interest to note that the two primary nutrients, nitrogen and phosphorus, were not "chemically combined" with each other except to a minor extent as ammonium phosphate. The author does not wish to infer that chemical combination of two nutrient elements in the same molecule is any advantage, but merely to point out that this state of chemical combination is not an inherent property of nitric phosphates.

One of the most complex of the products reported by Mr. Lehr was a nongranular 6-8-4 made by a process that might be described as "simply mixed." It contained fifteen identifiable compounds, mainly those formed by chemical reactions in the mixture including such complicated ones as $(K,NH_4)_2O \cdot 2Al_2O_3 \cdot 2P_2O_5 \cdot 5H_2O$. If this is a simple mixture, how complex would a complex fertilizer be?

In considering whether we should adopt the term "complex fertilizer," however defined, we may well consider what information we are trying to convey and to whom. The most numerous and important recipients of such information are the farmers who use the product. What information would a farmer derive from the term "complex fertilizer"? He might infer that it must be different in some unknown way from ordinary mixed fertilizer, and that there is something more complicated about it. Neither of these inferences would be necessarily correct or useful to the farmer even if correct.

The information that the farmer needs is the chemical compositon and physical properties of the products. The chemical composition is described by means of the guaranteed analysis. The physical properties of mixed fertilizer can be described by terms such as granular, semigranular, nongranular, blended, or liquid, although it might be helpful if some of these terms were also better defined.

Technologists and scientists have no lack of terms to describe to each other the various fertilizer products and processes so the term "complex fertilizer" would not be helpful for use in technical articles.

The term "complex fertilizer" is believed to have originated in Europe several years ago where it was used to describe a granular, homogeneous, mixed fertilizer, usually made by a nitric phosphate process, as opposed to a nongranular, dry-mixed fertilizer which was at that time the only other type of mixed fertilizer available.

It is quite possible that the term was useful at the time and in the countries where it was originated. At present, however, homogeneous, granular, mixed fertilizers are made by a variety of processes. Many European technologists prefer to describe all such fertilizers merely as "compound fertilizers," a term that has about the same meaning in Europe as "mixed fertilizer" in the United States.

It is concluded that the term "complex fertilizer" is not likely to be helpful to farmers, technologists, or scientists in the United States. Since even those who favor use of the term do not agree on its definition, it seems that only confusion would result from its use.

*We do not know whether this paper has been published; it was received from Dr. Ando in manuscript form.

NEW ZEALAND SEEKS PESTICIDE LICENSING ARRANGEMENTS

☆ ☆

New Zealand pesticide companies are reported to be seeking licensing arrangements with U.S. producers for increased shipments of basic materials in bulk form. According to the U.S. Business and Defense Services Administration, New Zealand is expanding its facilities for local formulation and packing, which tends to create a larger market for bulk shipments of material to be formulated or packed, rather than in finished products.

The U.S. government agency reported that New Zealand imports in 1959 included the following amounts in pounds and dollar value: DDT, 2.5 million pounds, valued at $602,801; copper sulfate, 473,760 pounds, valued at $46,318; and lead arsenate, 41,328 pounds, valued at $12,211.

In addition, imports of raw materials for local production of insecticides in 1959 were valued at $213,228, BDSA notes.

Pesticides, along with all other imports, are subject to import licensing regulations.

"Owing to the vital importance of agriculture to the economy," BDSA says, "no attempt has been made to restrict the importation of pesticides, and import licenses are readily available. Where British Commonwealth countries and most-favored-nation countries including the U.S. are subject to different tariff rates on pesticides, the advantage of Commonwealth preferences is insignificant.

How Union-Camp's 5-Star Plan saved multiwall bag user over $130,000 a year

Making things the same can sometimes make a whale of a difference. Particularly in a multiwall bagging operation. The Smith-Douglass Company, Inc., of Norfolk, Virginia proved it recently when they put Union-Camp's 5-Star Plan into action. The difference—in annual packaging savings—came to over $130,000 a year!

Standardize = Economize

Initial 5-Star Plan surveys at Smith-Douglass' six plants revealed that *standardization* held the key to major cost reductions. Three plants used sewn open-mouth multiwall bags. One used sewn valve bags. The remaining two plants used both types of bags.

Union-Camp's multiwall specialists showed that $30,000 a year could be saved by converting all six plants to sewn open-mouth bags and using open-mouth bag filling machines.

5-Star Plan in action. Plant surveys made by Union-Camp multiwall specialists paved the way for the major packaging savings described here.

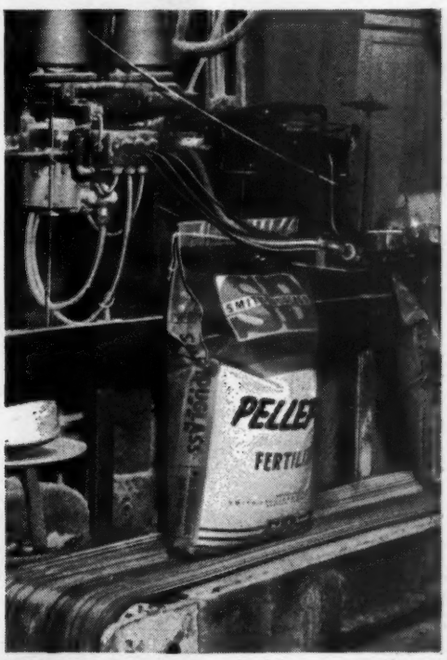
That was only the beginning. By carrying the change-over one step further, and standardizing on *size* and *construction* of multiwall bags, the company would save another $22,000 a year.

1 Design Replaces 160

Next, Union-Camp's survey team analyzed the company's existing bag *designs*. They found there were about 160 designs being used. Here, again, standardization was recommended.

By creating one basic design, eliminating an expensive yellow outer sheet, and using the same printing copy for all bags, the company netted additional economies of $84,000 a year.

$30,000 plus $20,000 plus $84,000. Total annual packaging savings—$134,000.



$30,000 a year savings resulted from converting to sewn open-mouth multiwalls in company's six plants.

How Much Could You Save?

Hundreds of companies—large and small—reduce their multiwall packaging costs by taking advantage of Union-Camp's 5-Star Plan. This comprehensive service is free. It covers bag design, bag construction, specifications control, packaging machinery and a survey of your materials handling operation. An improvement in any one of these areas conceivably could result in substantial economies for you.

See your local Union-Camp man for complete details.

This basic bag design, now used for all Smith-Douglass brands, reduced company's multiwall costs by $84,000.

FREE 16-PAGE BOOKLET

Write Dept. M-4 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall packaging operations.

UNION-CAMP
MULTIWALL BAGS
Union Bag-Camp Paper Corporation 233 Broadway N.Y. 7, N.Y.

QUESTIONS – ANSWERS

From You — From Experts

QUESTION—We have noticed discrepancies in our solutions inventory and suspect that our operators may fail sometimes to empty the tank cars completely. How can an operator be sure he has taken all the contents out of the car and that it is completely empty when returned?—Western fertilizer manufacturer.

ANSWER—By Elmer C. Perrine, Nitrogen Division, Allied Chemical Corp., New York.

It is surprising how many tank cars are returned to the supplier with considerable amounts of solutions remaining in them. This of course causes problems to the consignee and does indeed call for accurate means of being sure each tank car is emptied completely before returning it. Here are some suggestions:

Frequently, failure to empty the tank car is due to too little air pressure. Thus, this looms as a very important factor.

Experience may show that 30 lb. gauge pressure per square inch is required, when the tank car is full, to operate at a desired rate. When the tank car arrives, pressure is practically all vapor pressure from ammonia with very little from air.

High pressure on arrival may be desirable but it is also deceptive because it is often at, or above, the pressure required for operation. It pays to depend on AIR pressure to get the desired results, rather than ammonia pressure. It is important to have the correct air pressure on the car at all times until it is completely empty.

Very little air pressure may be required to start an adequate flow and some operators see no reason for maintaining much more than this minimum pressure for the entire operation. That's why some cars are returned to nitrogen producers nearly full of solutions, and many half full.

One reason for inadequate air pressure is a limited volume of compressed air. Measuring tanks have a notorious appetite for compressed air, especially when it is necessary to vent off the air to refill them, which is often the case when handling large quantities of solution.

This problem can be avoided by having a measuring tank large enough to provide a "cushion" over the full charge of solution. Another "cushion" can be a separate pressure-safe aluminum or stainless steel tank above the measuring tank, connected with large equalizing pipes and the usual safety devices.

Frequent inspection and flushing with water is advised for both tanks. Increased air space may not be a satisfactory answer for the highest vapor pressure. Economy of air here would be in the opposite direction — by using small measuring tanks.

Faulty pressure gauges, absence of any gauge, or improperly placed gauges are other causes for error. But the most common error is the failure to maintain a little MORE air pressure on the car after three-fourths of the solution is removed, right down until the last gallon is removed. Many operators knowingly permit the pressure to decline at this point for reasons that are hard to understand.

A full car has about 3½ lb. more pressure on the solution at the bottom than at the top where the pressure is read. Each 2 ft. of height exerts a pressure of about 1 lb. per square inch. Under a uniform but narrow enough margin of air pressure, the pressure on the solution at the bottom when a low level is reached will be reduced enough that some ammonia will boil out of the nitrogen solution. This level has been as high as the middle of the car and is all too often at the quarter-full level.

During operation this gas volume sometimes creates the same noises, jerking movements of the hose, bubbles in gauge glasses and sight flow indicators and meters, as are created by the rush of air at the instant the car does in fact become empty. There is no easy way of determining whether the emptying symptoms are caused by air or by ammonia gas, if the air pressure is at a questionable point.

The importance of maintaining accurate running records readily available to the operator cannot be overemphasized. Accurate pressure gauges, to be read only while there is no movement of air or gas past them, are very necessary.

When the car is about three-fourths empty, there seems to be an irresistible temptation to "coast" or use the existing pressure in the car to finish it without adding more air. When sufficient air pressure exists at this point no bad results are experienced but the practice gets the operator in trouble eventually.

Sometimes many hours are lost while sufficient air pressure is rebuilt to resume operations. Sometimes much nitrogen solution is returned in the car. Realistically, when car is nearly empty—about 5 lb. more air pressure should be added above the minimum necessary for the full car to compensate for the loss in static head of the liquid and so as to hold the ammonia in solution and out of trouble. (Always respect safe practices in general and watch the safety valve settings.)

To be entirely free of any concern over pressures that result in return of ammoniating solutions in tank cars, it would be necessary to operate with solutions that have no more than zero gauge pressures, but this would lead to some very unsatisfactory ammoniating solutions. Another alternative would be the impractical one of using the existing solutions at temperatures that would naturally provide zero gauge pressures.

To many people, it may seem strange that an operator would not know whether or not a car is actually empty. But there are understandable reasons why the situation might deceive the operator. Here are some of these reasons:

In measuring tanks the vent that releases air, so the tank can be recharged, sometimes becomes plugged. This stops the inflow at some short point.

Where the top or the bottom connections of gauge glasses become plugged, the actual flow into the measuring tank is not indicated in the gauge glasses.

Meters may become jammed or the holes in the distributor pipe plugged so no liquid can flow through the meter.

Pressure gauges may be faulty in themselves or poorly placed to lead to wrong conclusions. There may be too little air while the gauge shows ample pressure.

If pumps are used instead of air pressure, they can easily become vapor-locked from ammonia gas and all flow will cease.

At only slightly above normal operating pressures, some centrifugal pumps will abruptly cease to deliver any volume.

In hot weather or in changing to a nitrogen solution which has high vapor pressure, the possibilities of some of the foregoing problems arising are increased.

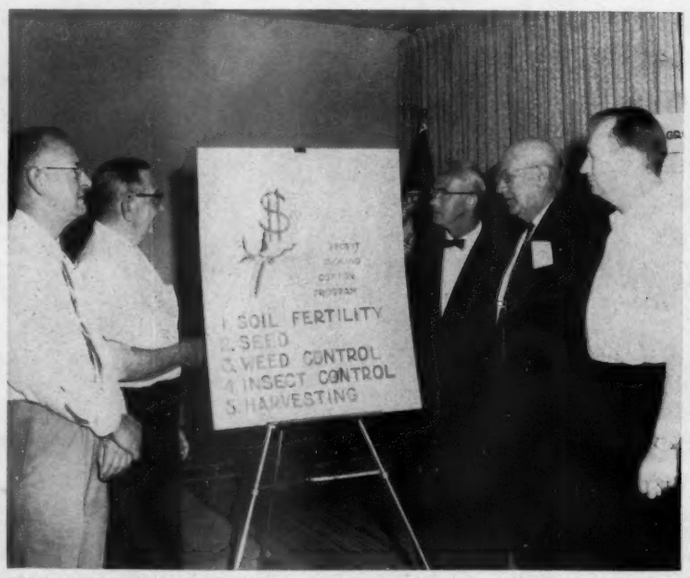
In extreme cases enough nitrogen salts will be precipitated in cold weather from some nitrogen solutions to plug the system and erroneously indicate that the car is empty.

The questioner says that failure to empty solution cars may have disrupted his plant inventory. He is fortunate if that is the sole extent of trouble caused by only partially emptying tank cars. The shortage of quantity is an obvious economic loss, but the real difficulty may come in later trouble in keeping fertilizer mixes up to grade, thus confronting the manufacturer with embarrassment and possible controversy. The insidious factor is in such an error not coming to light until inspection officers inform the company of something being wrong.

Failure to use all the solution in the car may result in the production of large amounts of off-grade fertilizer, as well as the closely associated trouble of over-proportioning. In over-proportioning, the accumulation of shortages may cause a shocking predicament, if a running inventory is not used conscientiously. This is especially true when the solution goes through a storage tank.

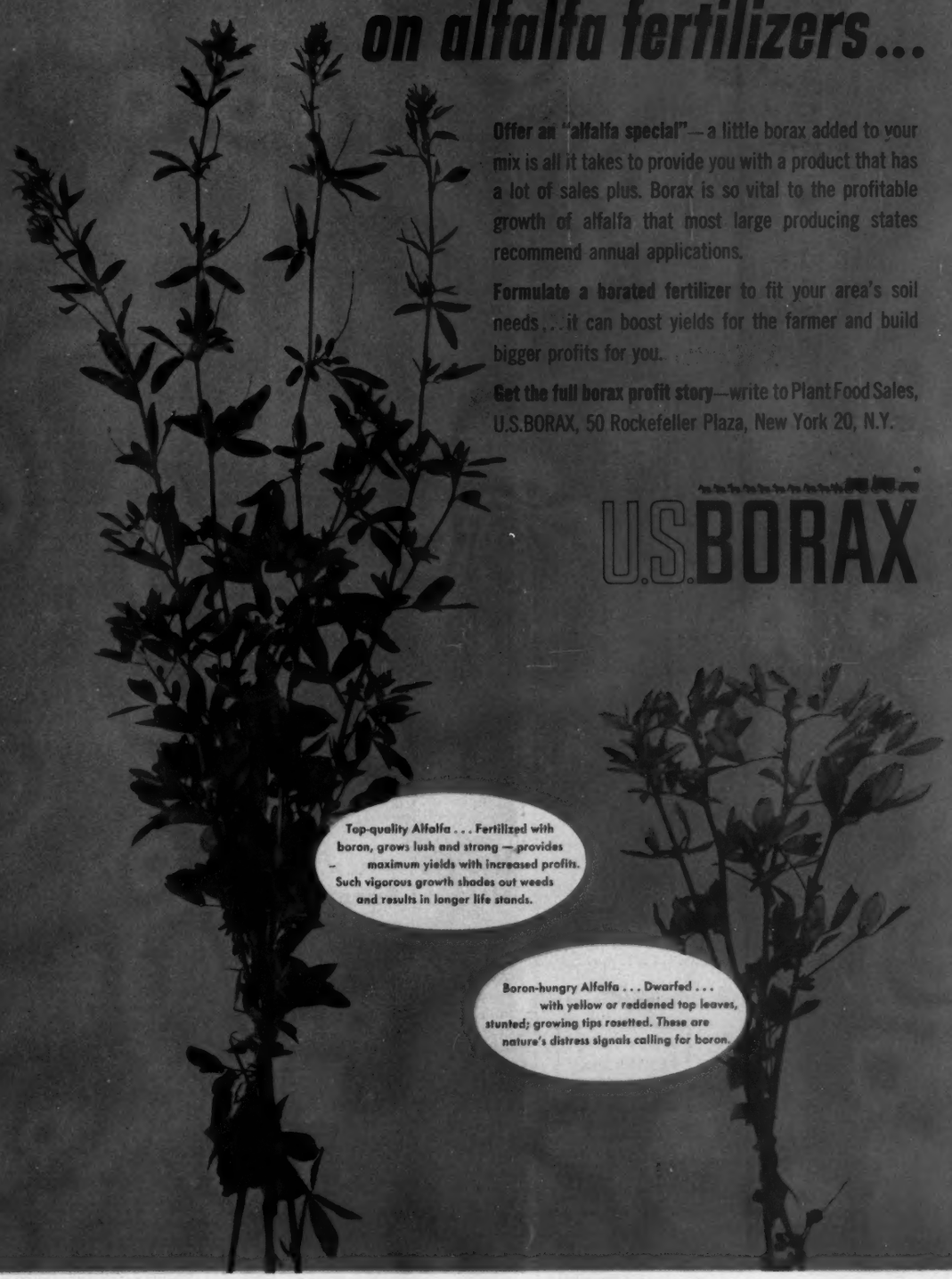
I hope the information contained here will be of interest to the inquirer, but also to others in the fertilizer industry who may have experienced similar difficulties.

STORAGE FACILITIES—Aluminum storage tanks for ammonium nitrate are being installed at dealer locations by St. Paul Ammonia Products Co. The all-welded tanks, 10½ ft. in diameter and 35½ ft. long have a 22,000 gal. capacity. They are made of aluminum alloy and according to Aluminum Company of America, are corrosion-resistant. In the photo, fertilizer solution is transferred from aluminum tank to truck for delivery to customers.



DOLLARS FROM FERTILITY—Those attending the recent convention of the Georgia Plant Food Educational Society at Jekyll Island, Ga., heard speakers tell about extra profits to be gained through optimum application of plant food, plus control of weeds and insects in crops. The "Profit Picking Cotton Program" announced by J. R. Johnson, at left, will be the fourth-year phase of the Intensified County Fertility Program. Mr. Johnson is agronomist at the Georgia Extension Service. Others in the picture, left to right, are: J. E. Nunnally, Cotton Producers' Assn.; R. S. Wheeler, dean of instruction, University of Georgia; G. H. King, director of the Georgia Agricultural Experiment Station; and G. A. Burson, Cotton Producers' Assn.

How to boost your profits on alfalfa fertilizers...



Offer an "alfalfa special"—a little borax added to your mix is all it takes to provide you with a product that has a lot of sales plus. Borax is so vital to the profitable growth of alfalfa that most large producing states recommend annual applications.

Formulate a borated fertilizer to fit your area's soil needs... it can boost yields for the farmer and build bigger profits for you.

Get the full borax profit story—write to Plant Food Sales, U.S.BORAX, 50 Rockefeller Plaza, New York 20, N.Y.

U.S.BORAX

Top-quality Alfalfa . . . Fertilized with boron, grows lush and strong — provides maximum yields with increased profits. Such vigorous growth shades out weeds and results in longer life stands.

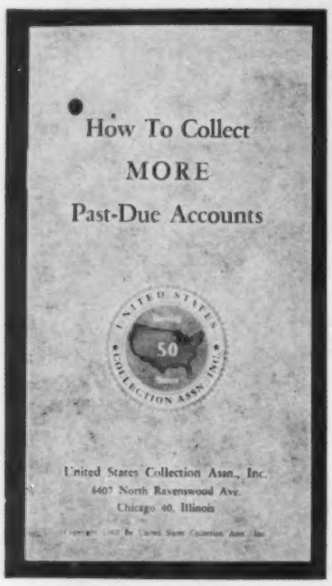
Boron-hungry Alfalfa . . . Dwarfed . . . with yellow or reddened top leaves, stunted; growing tips rosetted. These are nature's distress signals calling for boron.

WHAT'S NEW
IN PRODUCTS · SERVICES · LITERATURE

To obtain more information about items mentioned in this department simply: (1) Clip out the entire coupon in the lower corner of this page. (2) Circle the numbers of the items of which you want more information. Fill in the name and address portions. (3) Fold the coupon double with the return address portion on the outside and fasten the edges with a staple, cellophane tape or glue. (4) Drop in the mail box.

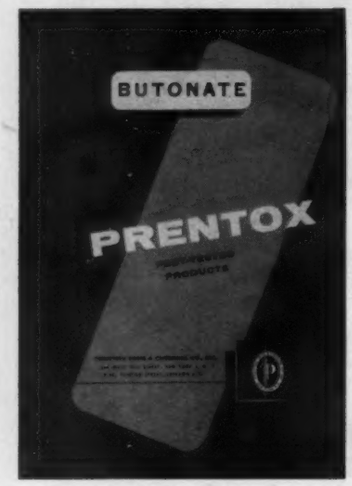
No. 9434—Account Collection Booklet

A new booklet, entitled "How to Collect More Past-Due Accounts," has just been published and is offered by the United States Collection Assn., Inc. as an aid to executives. This treatise was written by credit experts with wide experience in collection work. It describes the dignified and friend-saving principles of modern credit collection science. To obtain a free copy, check No. 9434 on the coupon and mail.



No. 9430—New Insecticide

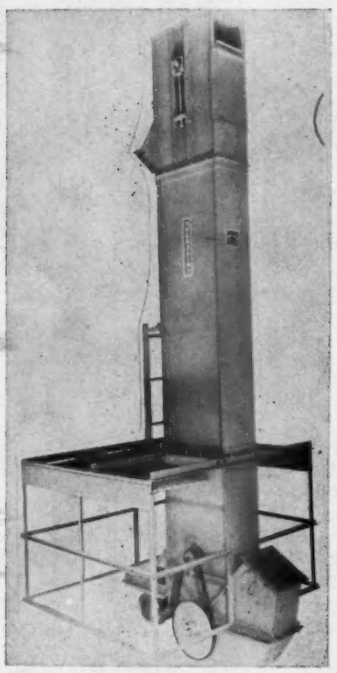
The Wisconsin Alumni Research Foundation has undertaken further



testing and development, as well as licensing functions, of a newly released household insecticide, butonate. WARF has granted license for its manufacture and distribution to Prentiss Drug & Chemical Co. The new insecticide ingredient is said to be non-staining, inoffensive in odor, and effective against a wide variety of insects. Field testing of promising agricultural applications of butonate is underway. For complete information check No. 9430 on the coupon and mail.

No. 9429—New Utility Bucket Elevator

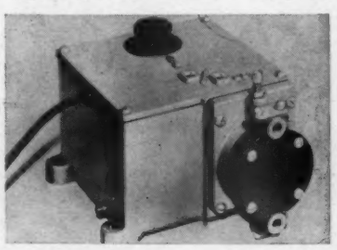
Universal Hoist Co. announces the availability of its new utility bucket elevator, Model U2. The company says it is designed specifically for fertilizers, range pellets and all hard-to-handle materials. It is manufactured in two bucket sizes in a variety of speeds. Maximum lump diameter sizes up to 2½" are said to be handled in capacities of 200 to 2,000 cu. ft. per hour. This new model is described as having heavy, single leg-



ging type construction, suitable for inside or outside installation. All standard accessories are available. For complete information, check No. 9429 on the coupon and mail.

No. 9431—New Metering Pump

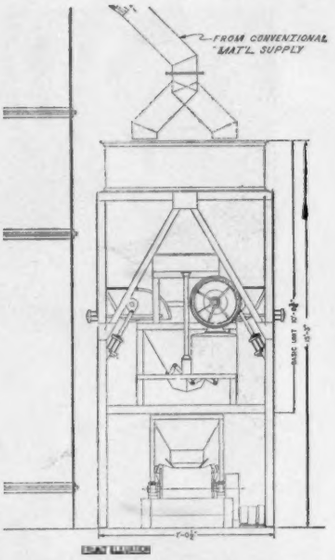
A new chemically-resistant metering pump is being supplied by Cole-Parmer Instrument and Equipment Co. The company says it provides control of volumes from 0 to 158 milliliters per minute. Flow volume may be varied by changing the setting. 9"x10"x7" overall, it may be



used as a portable laboratory unit or permanently mounted for use in pilot plant or for production. Two other models with different capacities are available. For complete descriptive literature check No. 9431 on the coupon and mail.

No. 9423—Batch Weighing Device

Inglett Development & Engineering Associates have developed a unit for batch weighing of dry mixed fertilizer materials. The makers state that their new batching unit desig-



nated as Model 614 combines advantages of weighing each material separately with the convenience of controlled, continuous flow batching. The units will handle several separate ingredients together, blending them by weight, the manufacturers claim. The machine can discharge into a take-away unit for continuous mixing, or directly into a conventional batch mixer. Units are completely automatic. The supply spout automatically revolves to the supply hopper next to receive material, and a panel indicates to the front end loader operator the name of the material next to be brought. The makers say that no labor is required to operate this unit. Output tonnages from a minimum desired up to 60 tons an hour can be acquired with close tolerances. For complete information and description of the new device, check No. 9423 on the coupon and mail.

No. 9426—Materials Handling Kit

An illustrated plant safety kit for fork lift truck operators is being of-

fered by Towmotor Corp. The kit contains a pocket-sized lift truck operator guide, four humorous safety cartoons for plant bulletin boards and four safety spot posters. For free copy of this informative safety kit check No. 9426 on the coupon and mail.

No. 9437—New Sewing Pedestal

Richardson Scale Co. has introduced a new sewing pedestal with an automatic initiator. The initiator is said to never need changing, being mounted on the horizontal slide of the pedestal, making it usable with various heads. This new feature is claimed to minimize downtime when a thread breaks or when the head is changed. For complete details, check No. 9437 on the coupon and mail.

Send me information on the items marked:

- ☐ No. 9423—Weighing Device
- ☐ No. 9425—Liquid Loader Catalog
- ☐ No. 9426—Materials Handling Kit
- ☐ No. 9427—New Vibrator
- ☐ No. 9428—Blender Brochure
- ☐ No. 9429—Bucket Elevator
- ☐ No. 9430—New Insecticide
- ☐ No. 9431—New Metering Pump
- ☐ No. 9432—Mobile Fertilizer Unit
- ☐ No. 9433—Model Bag Closer
- ☐ No. 9434—Account Booklet
- ☐ No. 9435—Multi-Purpose Spreader
- ☐ No. 9437—New Sewing Pedestal
- ☐ No. 9438—New Soil Fumigator
- ☐ No. 9439—Spinner Gear Case

NAME .....

COMPANY .....

ADDRESS .....

CLIP OUT—FOLD OVER ON THIS LINE—FASTEN (STAPLE, TAPE, GLUE)—MAIL

FIRST CLASS PERMIT No. 2
(Sec. 34.9, P. L. & R.)
MINNEAPOLIS, MINN.

BUSINESS REPLY ENVELOPE
No postage stamp necessary if mailed in the United States

POSTAGE WILL BE PAID BY—

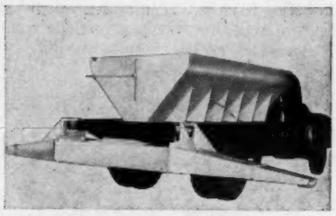
Croplife

P. O. Box 67

Reader Service Dept. Minneapolis 40, Minn.

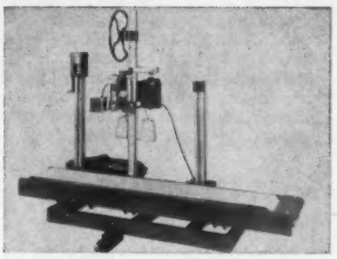
No. 9435—Multi-Purpose Spreader

A lime and fertilizer spreader, called the "Hawkeye" Convertible, has been developed by the Iowa Portable Mill Co. The makers say the spreader is adaptable for a flat bed truck, or a dump body, with quick conversion. It has a capacity of 7 tons of fertilizer or 9 tons for lime; body length hopper is 144 inches, and 43¾ inches high, and 78 inches wide. For complete information check No. 9435 on the coupon and mail.



No. 9433—Model Bag Closer

A new fully adjustable conveyor model bag closer which is said to sew any size bag from 1-100 lbs. has been introduced by Minneapolis Sewing Machine Co. The new model, HRC-200, permits the operator to regulate with a hand crank both the sewing head and the conveyor to the correct position for his height and the size of the bag. The new model is constructed of welded steel, with built-in castors. Standard equipment is a sewing head of cast aluminum, operated by either a foot pedal or an automatic start and stop switch. For further information check No. 9433 on the coupon and mail.



No. 9438—New Soil Fumigator

A new self-propelled soil fumigator, which its makers say can apply up to 150 gal. fumigant an acre, has been announced by the Agricultural

...and it has a pour-spout, too!

Here at last is a rip-open bag that has more to offer than mere speed! Sure, the new St. Regis® Grip 'N Rip bag opens fast (actually faster and easier than any bag of its kind). But there's more, lots more.

First, Grip 'N Rip has a unique pour-spout opening that can be custom-made to meet your needs. The glue under the top tape can be spaced to provide the exact size of pour-spout desired.

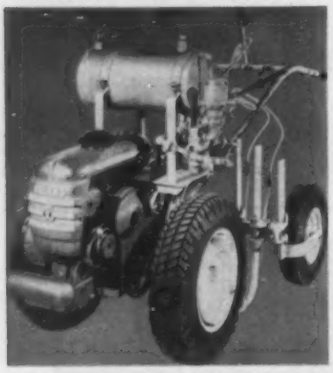
The pull tab on Grip 'N Rip is a triple-strength filter tape. Yet, one quick tug is all it takes and your bag is open. There's no thread to unravel either, as in competitive bags. And, you get all these Grip 'N Rip extras at a surprisingly low upcharge.

Grip 'N Rip is another example of St. Regis *Packaging-in-Depth*. This complete bag service assures you of the *right* bag, the *right* machinery to pack it, plus skilled engineering services. To meet your *future* needs, this program also includes continued research to develop improved packaging methods and economies.

PACKAGING-IN-DEPTH BY St.Regis BAG DIVISION

In Canada, contact St. Regis Consolidated Packaging Co., Ltd. PAPER COMPANY

Division of Morton Chemical Co. The unit is designed for use in both greenhouse and field. Liquid fumigant is injected under pressure behind four sub-soiler type chisels, with working depths up to 8 inches. Non-corrosive materials are used throughout, and the tank is stainless steel. Power is supplied by a 4 hp walking tractor. Speeds from 1.1 to 3.3 mph are available. Fumigating equipment is detachable so that other standard working tools can be used. For complete information check No. 9438 on the coupon and mail.

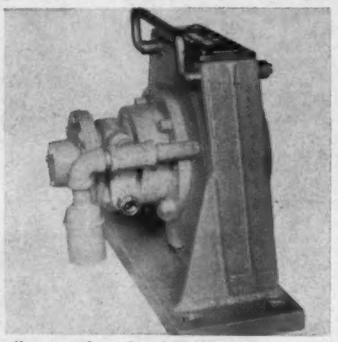


No. 9432—Mobile Fertilizer Unit

Barnard & Leas Manufacturing Co., Inc. has recently introduced a mobile fertilizer unit mounted on a 30-ft. enclosed trailer, custom-designed by their affiliated company, Transport Trailers, Inc. Special features include a hose carrying rack under the trailer and coupler attachments for quick setup. Capacity is said to be sufficient to process up to 30 tons of 8-24-0 an hour, with continuous operation, making it possible to service more than one blending unit in a day. The company also makes a mobile converter for producing aqua ammonia used in processing 8-24-0. For further information check No. 9432 on the coupon and mail.

No. 9427—New Vibrator

Martin Engineering Co. announces a new, permanent mount style for its high amplitude series of vibration inducers. It is designated "DVP" and is available in five sizes. The manufacturer says it is for jobs requiring great power and light weight. Air motor operation is standard in all sizes in a choice of gasoline, hydraulic and electric drives. The vibrator is controllable by use of an air line regular said to allow speeds from 100 to over 8,000 RPM. A wide range of amplitudes, forces and frequencies permits testing to determine the right vibrator for the job. For illustrated catalog with complete information check No. 9427 on the coupon and mail.



No. 9425—Liquid Loader Catalog

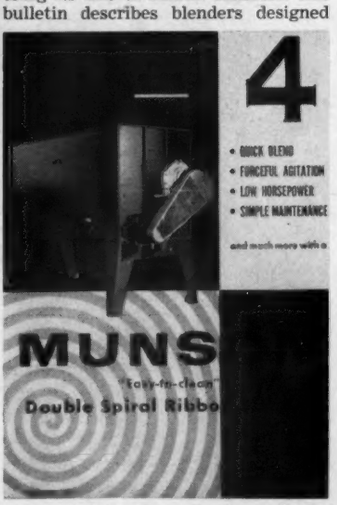
A new 28-page catalog on liquid loaders is available from OPW-Jordan Corp. Illustrated and described are the company's seven basic types of liquid loaders and three types of balancing systems. Included are suggestions for use and complete engineering and technical information. For free copy check No. 9425 on the coupon and mail.

No. 9439—Spinner Gear Case

Highway Equipment Company's New Leader Model "L-52S" spreader is equipped with factory-lubricated and sealed spinner gear cases which incorporates a hardened shaft and tapered spine for positive pulling and to eliminate slippage. A separate sealed gear case is provided for each of the twin spinners. For further information check No. 9439 on the coupon and mail.

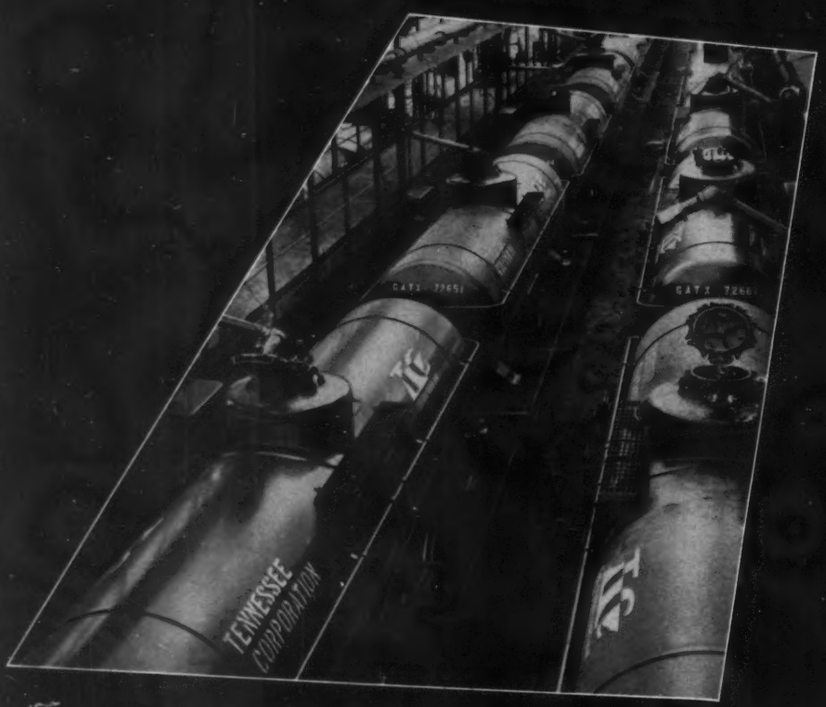
No. 9428—Ribbon Blender Brochure

Munson Mill Machinery Co. is offering a new 4-page brochure covering its line of ribbon blenders. The bulletin describes blenders designed for a variety of applications. It includes application data, engineering specifications and construction information. For copy check No. 9428 on the coupon and mail.



SULFURIC ACID

WE ARE BASIC PRODUCERS



SERVING THE GROWING SOUTHEAST

The Sulfur contained in the Ore we mine yields Virgin Sulfuric Acid of highest quality. We produce all grades of Sulfuric Acid from 60° Baume through the various Oleums.

Call JAckson 3-5024, Atlanta, Georgia, or write

TC TENNESSEE CORPORATION

TENNESSEE CORPORATION

612-629 GRANT BUILDING, ATLANTA 3, GEORGIA

"Thanks for going steady....."

says Big Chief Kay-Two-Oh. And it's not Minnehaha he has in mind, but YOU, the loyal customers who've re-ordered Potash again for the coming season.

"Moon after moon (Indian bop talk for 'time after time'), paleface buyers prove faithful in ordering from Pee-Cee-A-Tribe. Me heap grateful." That's a long speech for the usually silent Big Chief. It's his way of saying "Thanks" for your contract, and of letting you know that he means to keep your good will by keeping Pee-Cee-A service the best this side of the Happy Hunting Grounds.

In closing the Chief says "How". Which means: if there's any way the Pee-Cee-A scout in your territory can be of service to you, send him a smoke signal and tell him "How".

When you're in Manhattan stop by the Chief's wigwam at 630 Fifth Avenue and let him make you welcome.

POTASH COMPANY OF AMERICA

CARLSBAD, NEW MEXICO

"America's CHIEF Supplier of Potash"

General Sales Office:
630 Fifth Avenue, New York 20

Midwestern Sales Office:
First National Bank Building, Peoria, Ill.

Southern Sales Office:
1776 Peachtree Building, N.E., Atlanta, Ga.

Canadian Sales Office:
2 Carlton Street, Toronto 2, Ontario

Phone, write, wire or telex us at:

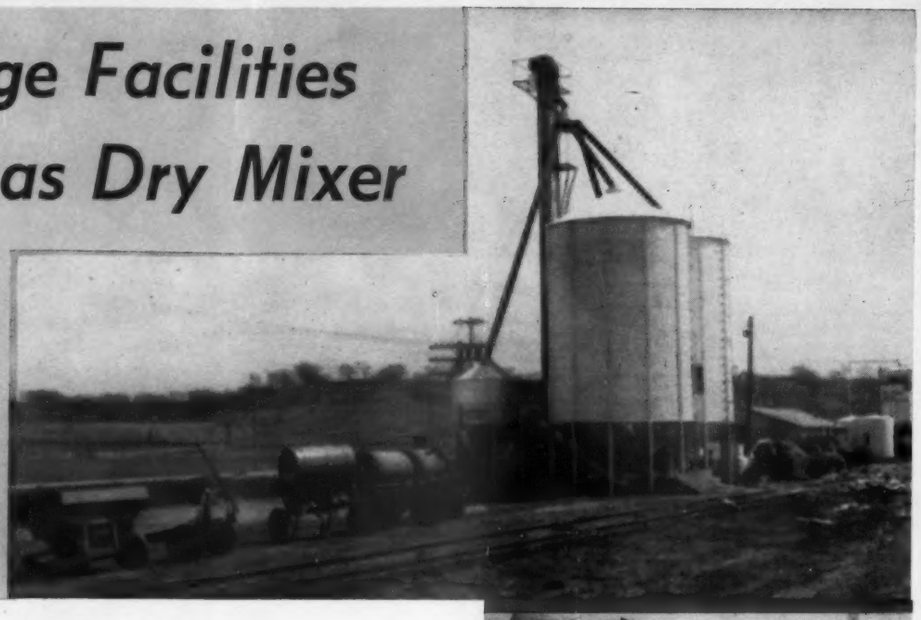
Phone LT 1-1240, New York

TWX NY 1-5386

P.C.A. "The SALT of the EARTH" RED MURIATE

PCA Standard 60% Muriate of Potash
PCA Coarse 60% Muriate of Potash
PCA Granular 60% Muriate of Potash
Potassium Chloride (99.9% KCL min.)
Sulphate of Potash

Metal Storage Facilities Used By Kansas Dry Mixer



FERTILIZER FACILITY—At right is general view of Agricultural Business Co. setup from railroad side of plant. Metal bins are for storage of "Agriblend" granular fertilizer which company sells in both bags and in bulk. Considerable amount of plant output is applied for customers. Company owns three spreader trucks, and large assortment of tow-type liquid and dry applicators, some of which are seen in picture.

SERVING an agricultural area in a radius of 25 miles, with retail fertilizer and pesticide application service, the Agricultural Business Co., Lawrence, Kan., operates a distinctive manufacturing facility making both liquid and dry fertilizers, and acting as a distributor of various pesticidal products. Its wholesale business is carried out through over 100 dealers in seven states.

Dean McHard, president of the company, says that the business was started a few years ago as a strictly liquid fertilizer enterprise, mixing various analyses and providing application services for the farmers in his marketing area. Early in 1961, however, the firm expanded into manufacturing what Mr. McHard calls "Agriblend" granular fertilizer which the company sells in both bags and in bulk.

A few unusual features are evident in the Kansas plant. The liquid facilities are standard, with storage and mixing tanks, pumps and gauges, meters and a control room. The most obvious difference between the Agricultural Business plant and most others, however, is the presence of metal storage units for dry fertilizer. Mr. McHard says that the system he uses has proved both efficient and economical.

"We make use of Butler bins, which we use for the handling of granular fertilizers. Our system is a complete push-button operation. Raw materials come in by hopper-bottom cars on the adjacent siding. These unload into a screw conveyor which takes the fertilizer materials into the leg. The plant food is then carried up and dumped into the bins.

"At the present time, we have two large bins, one for 16-48-0 diammonium phosphate granular fertilizer. The other is for urea or ammonium nitrate."

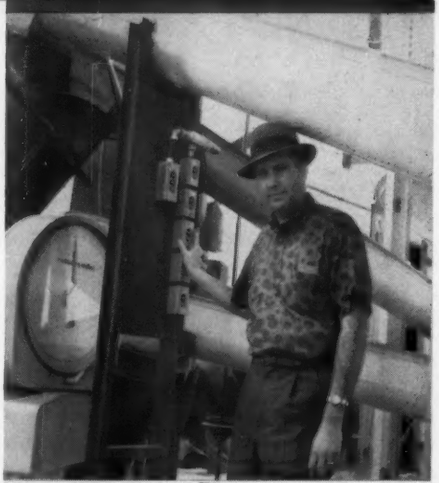
The metal tanks are protected against corrosion through linings of epoxy resins which Mr. McHard says do an effective job. The resin interior of the tanks, plus the fact they are air-tight, stops corrosion completely, he said. "If tanks like these are located in areas of extreme humidity, a drying system may be added. But we don't feel that this is necessary in our location," he noted.

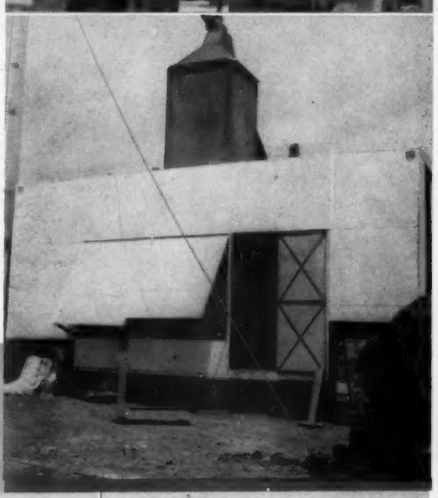
Of course a considerable amount of the mixed fertilizer is sold in bulk, and much of this is applied for the customer through equipment owned by the fertilizer manufacturer. The firm owns three spreader trucks and a number of dry spreaders of the type pulled by tractors. Mr. McHard says his firm also owns a number of liquid applicators which are either leased out to customers, or are used for applying the plant food for the farmer.

"One of our principles of business is to give our customers the very best service possible. We have found that the farmer has confidence in our products and likes our services," he said.

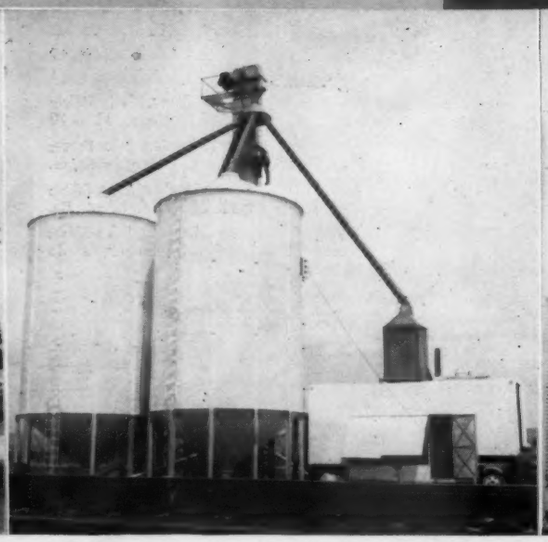
The bagging unit used by Agricultural Business was designed by the company. Mr. McHard points out its broad flexibility and utility. "This unit is housed in a highway trailer which can be attached to a truck and hauled anywhere to service fertilizer plants. We have found the portable bagging equipment to be highly effective," he said.

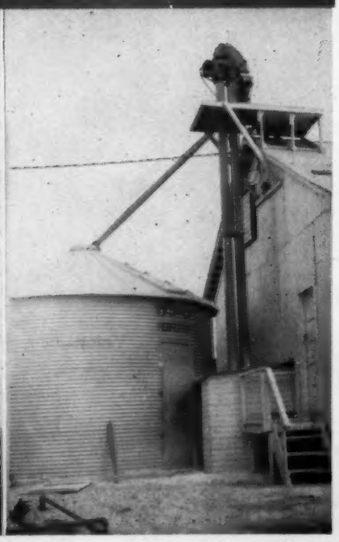
In its location at the Agricultural Business





AT LAWRENCE PLANT—Next to top photo shows Dean McHard, president of Agricultural Business Co., at push-button controls of mixing plant. One person can operate much of the dry mixing portion of the facility from this panel. At right is exterior view of portable bagging unit housed in highway trailer. Feed pipe connects bagger with elevator leg operating from metal storage unit at left. Below, left, is out-of-door mixer. Center, below, is broader view of storage tanks and portable bagger, and at right, elevator leg and additional storage facilities.





The importance of follow-through in NH_3 and Nitrogen Solutions purchases

by Ray Funk

About the Author.
Follow-through is Ray Funk's specialty. He has been doing such work for 14 of the 23 years he has been engaged in sales work For the last six years, Ray, as Product Distribution Coordinator, has devoted his time exclusively to customer service work on nitrogen products.

* * *

Follow-through on a sale is for the seller *not* the buyer. The ideal in this follow-through is to obviate the need for the buyer to do anything further after placing the order except to be ready to receive the shipment when it arrives. As a seller, we often go beyond the delivery responsibility by helping a customer in such matters as designing facilities for storage and handling. We may also assist him with educational programs on the safe handling of the Ammonia and Nitrogen Solutions.

But there is much more than this to sales follow-through on NH_3 and Nitrogen Solutions Sales. When we receive an order for Anhydrous Ammonia or Nitrogen Solutions, we must be ready to tell the customer at any time exactly where his shipment stands and when he should be receiving it. We must know what tank cars are available, when they will be loaded and when they will leave our siding. We must also know when the railroad who receives the car will be making it into a train. And of course, we must know the routing that will most expeditiously deliver the shipment to the customer.

This same attention to follow-through is true of truck shipments. We schedule accurately the arrival, loading and departure of truck transports from the plant; the surest route and the time of delivery. During peak Spring and Summer this is critical. To us it is important that the needs of our customers are attended to without interruption regardless of the method of delivery or seasonal peaks.

* * *

Would you like this kind of follow-through on your purchases of NH_3 and Nitrogen Solutions? Call American Oil Company.

AMERICAN OIL COMPANY
910 SOUTH MICHIGAN AVENUE
CHICAGO 80, ILLINOIS

AMERICAN

plant at Lawrence, the bagging trailer is situated adjacent to a siding of the Union Pacific Railroad. Rail cars can be spotted beside the bagger for easy loading, or highway trucks ca nbe loaded from a door in the portable bagging room.

Mixing of fertilizer grades is accomplished in a large rotary mixer. The dry fertilizer mixing plant has a capacity of 15 tons an hour, and the liquid facilities are also rated at 15 tons an hour.

Mr. McHard founded the firm in 1955. He is a graduate agronomist of Oklahoma State University. The firm employs some 20 persons full-time.

Awarded Contract

Chemical Construction Corp., New York, has been awarded a contract to design, erect and supply equipment for a 120 ton per day nitric acid plant, by Cooperative Farm Chemicals Assn. at Lawrence, Kan.

California Changes Annual Fertilizer Report Book

California's Department of Agriculture has made substantial changes in its annual booklet, "Fertilizing Materials," issued recently by the bureau of chemistry.

This year, said the Department of Agriculture, the table of registrants shows a summary of all samples per registrant followed by the number of those which were passed, deficient, misbranded, or not registered. The table also shows the number of samples per type of material.

In explaining these categories, the booklet said: "A product was deficient when repeated analysis showed the sample was substantially short in one or more ingredients. . . . A product was misbranded when the tag or label describing the material did not conform to requirements of law for some reason. Omission of information or statement required by law or regulation is the common error."

Award Winner Named

Harold D. Guither, assistant extension editor, College of Agriculture, University of Illinois, Urbana, was presented on July 24 the "Agricultural Communications Award," sponsored by the American Association of Agricultural College Editors and the National Plant Food Institute.

Announcement of the award was made by Elton Tait, assistant to the director of extension, in charge of training, Pennsylvania State University, University Park, president of AAACE in connection with the 45th Annual Convention of the association.

ONTARIO INCOME UP

Total cash income of Ontario farmers in 1960 was $877,069,000, an increase of nearly $20 million over 1959, it was announced by the farm economics and statistics branch of the Ontario Department of Agriculture.

SYMBOLS OF PLANT LIFE

HIGH-K

A 20TH CENTURY SYMBOL FOR HIGHEST QUALITY POTASH

In the middle ages, working with little help from prior research, alchemists frequently developed materials by accident.

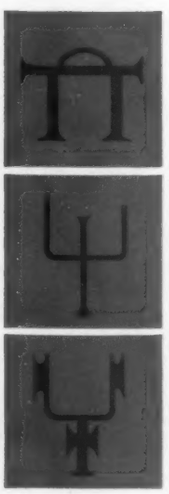
TODAY, MATERIALS ARE DEVELOPED BY PLAN TO MEET A NEED—JUST AS EACH TYPE OF HIGH-K MURIATE IS MADE TO MEET SPECIFIC REQUIREMENTS.

STANDARD HIGH-K MURIATE IS TAILOR MADE FOR CONVENTIONAL FERTILIZER MANUFACTURE AND VARIOUS RATIOS OF GRANULATED GRADES. IT FEATURES UNIFORM PARTICLE SIZE RANGE AND CHEMICAL ANALYSIS.

COARSE HIGH-K MURIATE IS USED IN THE MANUFACTURE OF CONVENTIONAL FERTILIZER AND IS ESPECIALLY USEFUL IN GRANULATION PLANTS. REASON: A CRYSTAL STRUCTURE WHICH DOES NOT BREAK DOWN WHEN ACIDS AND OTHER LIQUIDS ARE USED IN FORMULATION.

GRANULAR HIGH-K MURIATE IS A LARGER PARTICLE SIZE MURIATE FOR SPECIAL USE. SOUTHWEST POTASH PIONEERED THE PRODUCTION OF THIS ALL COMPACTED PRODUCT.

OUR PLANT PROCESSES ARE CONTINUALLY BEING MODERNIZED TO SUPPLY TYPES OF MURIATE NEEDED AND PREFERRED BY FERTILIZER MANUFACTURERS. ON SCHEDULE SHIPMENT, CAR AFTER CAR, DAY AFTER DAY, IS MAINTAINED THROUGHOUT THE YEAR.



Medieval alchemists' symbols for potash and cribbled ashes

SOUTHWEST POTASH CORPORATION

1270 Avenue of the Americas, New York 20, N.Y.

Letters to the Editor

To the Editor:

In the July issue of Croplife, two references are made to new pesticide legislation enacted by the State of Washington this year.

A page 2 report on new legislation passed in several states asserts: ". . . It was in Washington State where the lawmakers voted to license all sellers of pesticides. State officials are reported to concede that the measure was designed to reduce pesticide sales throughout the state, and revenue from the licenses will be used to enforce the state's laws concerning chemical products used on the farm. . . ."

This language is also used in a reference to the Washington law in an editorial on page 42.

The statement is incorrect both as to the content of the law and as to its intent.

As to the law itself:

Far from licensing all sellers of pesticides, the new law licenses only dealers who sell pesticides in commercial quantities (defined in the law as amounts in excess of 5 pounds or 1 gallon), or who sell highly toxic pesticides in any quantity (as defined and interpreted by the USDA). Thus, exempted from licensing are a large number of sellers who handle only the non-highly toxic pesticides and others only in small quantities.

As to the intent:

The law was not written to "reduce pesticide sales." It was written to restrict sales of pesticides in commercial quantities and of highly toxic pesticides in any quantity to licensed dealers. The purpose of this restriction is to insure greater care in the handling of certain chemicals, proper instruction to users, and a workable system of issuing permits for use of certain pesticides when and if such pesticides are put under special orders governing application. It seems to us that these are purposes to which the majority of the members of the agricultural chemical industry subscribe.

The statement in your publication also might be interpreted as implying that the cost of enforcing these laws is carried by the license fees. The opposite is true. More than half of the cost of enforcing both the law governing sales of pesticides and the law governing application of pesticides is carried by tax funds.

Finally, your readers may be interested in the procedure followed in developing these laws. An industry committee, representing all segments of the industry and including representatives of pesticide users and the general public was organized at the direction of the Agricultural Subcommittee of the Legislative Council, which had been given the responsibility of making recommendations to the 1961 Legislature on pesticide measures. This committee worked in close cooperation with the Agricultural Subcommittee and the State Department of Agriculture for nearly two years before recommending these acts to the Legislature.

It is felt by many who are associated with the industry that this regulatory approach will have a stabilizing effect on the pesticide business, and no discrediting inference should be drawn upon the legislators of Washington State because "to the credit of others, legislators in quite a number of states saw fit to pattern their laws after the federal act. . . ."

Joe Dwyer
Director, Washington State Department of Agriculture, Olympia, Wash.

Arcadian® News

Volume 6 | Nitrogen Division, Allied Chemical Corporation | Number 8

Turf is a Big Market for Fall Fertilizers

The green grass in home lawns, playgrounds, golf courses, airports and other non-crop land is a huge and expanding market for fertilizers—spring, summer and fall. It is a particularly good sales opportunity in the fall. Turf experts recommend a heavy application of fertilizer to established grass in the fall. Early fall is also the best season for starting new lawns and renovating old ones.

Year-round Market

Right now is an excellent time to go after this year-round market. More than half of the home-owners who have lawns use fertilizer, and an even bigger share of the commercial turfed areas are being fertilized to keep them lush and green.

Non-farm uses of fertilizer now make up about 15% of the total tonnage sold and much more than 15% of the money spent for fertilizers. Turf gets the biggest share of this non-farm fertilizer. Turf is a fertilizer market that is seldom hurt by drouth and it is unaffected by government crop reduction programs.

Beautiful green turf is the pride and delight of the grower. Help him to grow better grass with fertilizer and you are launched in a profitable market. Today it's easy to produce the easy-handling, odor-free, concentrated fertilizers containing slow-release nitrogen that turf growers need and want for best results.

Nitrogen Division, Allied Chemical Corporation, can supply you with the nitrogen products you need for making high-quality turf fertilizers in the most popular and efficient plant food ratios, such as 3-1-1 and 2-1-1.

Turf grass needs plenty of nitrogen along with moderate amounts of phosphate and potash. The average lawn is mowed once a week through a long growing season, with an inch or so of growth removed at each clipping. This means that a tremendous amount of leaf surface is produced each year.

Methylene Ureas

To keep this new growth coming along regularly to maintain a well-kept lawn, the shallow-growing roots of turf grass need a steadily available supply of plant foods. The usual forms of nitrogen which are quite satisfactory for short-season or deep-rooted farm crops tend to become available too fast and to disappear from the shallow root zone of close-cut lawn grasses.

To maintain the steady, even growth that makes a good lawn, your fertilizer needs the slow-release, long-lasting nitrogen in methylene ureas produced by Nitrogen Division, Allied Chemical Corporation. For high-analysis turf fertilizers, it will pay you to use ARCADIAN N-dure, ARCADIAN Urea 45 and one of the ARCADIAN U-A-S Nitrogen Solutions. For less concentrated fertilizers and for formulas containing a smaller percentage of nitrogen from the slow-release methylene ureas, ARCADIAN DURANA Nitrogen Solution is ideal for use in ammoniation.

Small Package Market

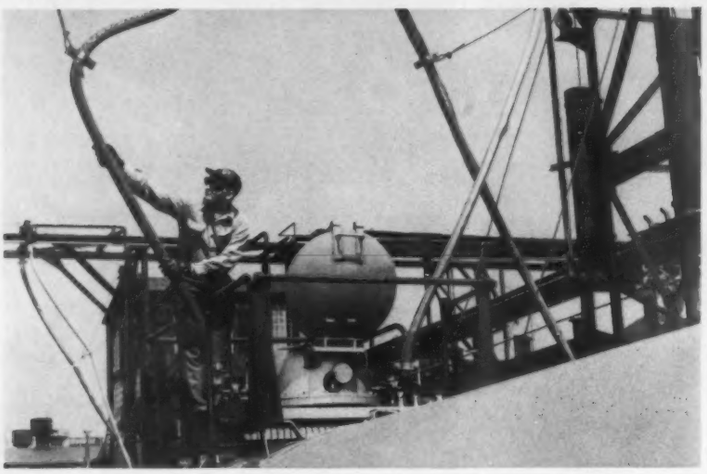
The turf market for fertilizer is largely a small-package market. But there are many repeat customers for high-quality turf fertilizers and they come back for more several times a season, not just once a year. This helps you to develop year-round tonnage by building a reputation with satisfied customers.

Right now you can get ready for the fall turf fertilizer sales season. By getting production under way now, you can cash in on the fall season and also produce turf fertilizers for 1962 ahead of your production of regular fertilizers.

See your Nitrogen Division, Allied Chemical, technical representative. He will advise and assist you on the formulation and production of high-quality turf fertilizers. Contact: Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

"ARCADIAN", "N-dure", "U-A-S" and "DURANA" are trade-marks of Allied Chemical Corporation.

Arcadian News for Fertilizer Manufacturers from Nitrogen Division, Allied Chemical



Your choice and care of HOSES

Hoses and their fittings are important equipment in your plant. Frequent handling, often under difficult conditions, makes it advisable to choose the right hoses and use them well. Get the best possible recommendations from your supplier. Let him know what kind of liquids will be going through your hoses and fittings. Indicate the maximum working pressure to which a hose will be subjected. Then he can provide equipment that will perform safely for a long time. Here are some factors to consider when ordering hose equipment:

Pressures

In fertilizer manufacturing, anhydrous ammonia exerts more pressure on hose than any other material. Remember, vapor pressures are only a guide to determine probable working pressures of a material. Sometimes it is necessary to apply 20 pounds or more of pressure beyond vapor pressure to assure satisfactory operations with an ammoniating solution.

Vapor pressures in tanks are more the result of temperatures of the vapor and the surface of the liquid than mass liquid temperature. Such pressures can develop in most parts of the country even though atmospheric temperatures never reach high levels.

Approximate Vapor Pressures (Gauge) of Some Materials in Pounds per Square Inch

	104°F.	120°F.	130°F.
Anhydrous Ammonia	211	272	316
Nitrana® 6 Solution	48	68	—
Nitrana 3MC	34	50	61
Urana® 10	22	35	44
Urana 6M	17	27	34

Positive displacement and some centrifugal pumps are capable of developing pressures beyond the safe limits of hose equipment. Relief valves can protect against runaway pressures. Without these valves, serious situations can suddenly develop. Excessive pressure can rupture the hose or force it off its couplings. Keep this in mind when ordering hoses for acids, ammoniating solutions and anhydrous ammonia.

Hose Construction

Specific hose, fittings and gaskets should be provided for certain chemicals. It may be dangerous to use the wrong hose for economy or convenience.

For example, forged steel fittings and steel armor protection on hoses that handle anhydrous ammonia would be quickly destroyed by acids, and ammoniating solutions. Rubber is suitable for phosphoric acid and nitrogen solutions, but it is damaged by sulfuric acid.

Stainless steel is stronger than aluminum, and is preferred for the ammoniating solution hose fittings. Use appropriate materials for gaskets in the couplings, and make sure they are of the right size and in good condition.

Remember that ammonia gas—and, conceivably, liquid solutions—are under considerable pressure at one end of the compressed air system. Therefore, at the tank car you should use hose made for compressed air. Use steel, malleable iron or stainless steel fittings for air hose.

The hose manufacturer must be trusted to supply hose for the job as described, but choice of fittings often is left to the buyer. Frequently the buyer attaches his own fittings, particularly when replacing them on old hoses. Fixing of fittings on heavy hoses that handle hazardous materials is *no job for amateurs.*

Where quick-acting couplings are used, every precaution should be taken to make certain there is no pressure in the system when the coupling is being disconnected. A small valve for bleeding off pressure—and the liquid or gas—is a worthwhile addition.

For hazardous products, four large bolts on each hose clamp are highly recommended. There have been some bad accidents caused by the failure of bands or inadequate clamps on hoses.

Use and Maintenance

After hose equipment is installed, it will pay you to see that it is used and cared for properly. Some major causes of failure or short life of hoses and fittings are:

- Kinks at the ends of inserted fittings; kinks caused from not using pipe elbows when advisable, or by poor handling and storing. Hoses should be stored straight and flat, horizontally.
- Deterioration from sun, excess heat, oil, grease and water. You can prevent water from entering the fabric of raw ends at the couplings by coating with rubber cement.
- Strain on tank car valves and at other points. Use short nipples at tank cars to avoid excessive strain.
- Corrosion and wear of metals. Wear in the threads of stainless steel and aluminum will weaken these points in the line. Careful inspection before every use and cold water pressure tests at least four times greater than the working

pressure, conducted twice a year, will go a long way toward avoiding accidents.

When a hose is removed from duty, it is a good idea to flush out residues with water. This may avoid injuries to plant personnel.

Workers should wear chemical-plant safety goggles, full-face shields, protective head-gear and full-length chemical-plant rubber gloves when connecting or disconnecting tank cars. Ammonia-type gas masks should be available for workers who may run into emergencies while handling anhydrous ammonia and ammoniating solutions. A good supply of water near the connected hose, but protected from possible spraying, is a sensible precaution.

Some operators follow a practice of replacing all hose every two years. Like a chain, the hose is no stronger than its weakest link. Make sure all your "links" are strong enough.

Ask Nitrogen Division

Nitrogen Division technical service men have a thorough knowledge of methods used by manufacturers to speed production of good-condition mixed fertilizers. It will pay you to get their advice and assistance. This service is available to customers without charge. Simply contact Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y. Phone: HAnover 2-7300.

Organize Bulk Handling for Farmer Application

It's time to get set for bulk handling of fertilizers spread by farmers and by custom application. Most fertilizer is bought in bags and spread by farmers. You can increase fertilizer tonnage and profits by helping dealers move into bulk handling and spreading. Everybody down the line saves time, labor and expense. And you have an excellent opportunity to get and hold more customers.

Your best bet is to strengthen the weak link in most bulk-handling systems — the final stage of getting the fertilizer into the farmer's grain drill, planter or broadcast fertilizer spreader. In custom spreading, your dealer is limited by the number of expensive bulk trucks he can afford and the road time travelling to farmers' fields. Simple and inexpensive bulk tanks or bins for use on the farmer's truck or wagon are the real answer to bulk-spreading sales and profits.

Rent Bins

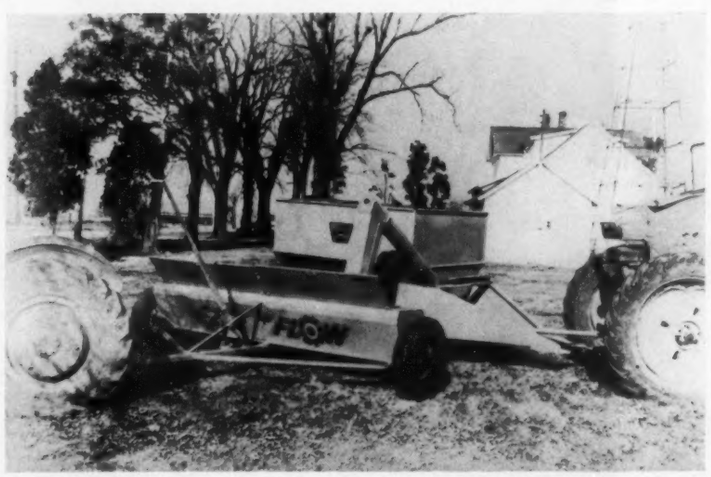
Your dealers can sell or rent these simple, sturdy bins of plywood or steel to a large number of farmers. A hoist or fork lift easily places a bulk bin on a farmer's truck. A push button fills it at your plant or dealer's storage. The farmer can bring the bin back for quick bulk fertilizer refills as often as needed. Or, you lift the bin onto the next truck.

Make It Easy!

The portable bins which unload by gravity direct into the farmer's grain drill or the hopper on his fertilizer spreader, are the simplest of the new bulk-handling systems. Self-unloading feed or grain wagons with auger attachments are also excellent for fertilizer hauling and handling. New planters, drills and spreaders have larger fertilizer hoppers to simplify filling from bulk or bag. Help make it easy for the farmer to handle bulk fertilizer for row or drill seeders and broadcast spreaders and you increase your sales of your most profitable mixed fertilizers.

When you organize for bulk handling of fertilizer all down the line, your farmer customers know you are in business to provide efficient service. You'll be fully equipped to handle the needs of the farmers who buy the most fertilizer. Bulk handling and bulk spreading are becoming a necessity in modern farming, where back-breaking chores must fade out of the picture. Good farmers know that high yields require plenty of fertilizer in the row and plowed down. Make it easy for them to apply your fertilizer, and you get more business.

Results on thousands of farms show that farmers who turn to bulk handling and spreading use more fertilizer. Many of the dollars saved on labor and handling are spent on more fertilizer. The back-breaking chore of handling bags is no longer a bottleneck to fertilizer sales. Bulk up your fertilizer business by getting organized for bulk handling!



This self-unloading bin with auger attachment from tractor take-off automatically unloads fertilizer from the bin into the distributor. This type of equipment enables the farmer to do his own custom spreading of bulk fertilizer.

NOTE: The information furnished in this issue of the ARCADIAN News is obtained from studies and tests considered reliable; results, however, are not guaranteed.

Helpful Fertilizer Data in 1959 Census Reports

The fertilizer industry is finding a "gold mine" of helpful information about farms and farmers in their areas in the 1959 U.S. Census of Agriculture. Report sheets (AC 59) for each state and county are for sale at 10 cents each by the Bureau of the Census, Washington 25, D. C. There is a minimum of waste because you can order sheets for only the states and counties you specify.

Much publicity has been given to the decrease in number of farms during recent years. Census of Agriculture reports show that this is true, but in most counties the number of acres per farm has increased. Of special importance to fertilizer people is the fact that from 1954 to 1959 the number of acres fertilized in 48 states increased from 122,809,445 to 132,133,068 (7.6%) and total tons of commercial fertilizer used by farmers increased from 18,869,117 to 19,673,490 (4.2%) during the same period.

The Census of Agriculture report sheets provide much more information of practical importance to fertilizer men who wish to study their markets. For each state and each county they give 1959 and 1954 data on a comparable basis, for the following: total number of farms; total acres in farms; average size of farms; value of land and buildings — average per farm and per acre; land in farms according to use, e.g., cropland, pasture, irrigated land; and, number of farms by 12 size categories and 4 types of operators: full-owners, part-owners, managers, and tenants.

Answers to some rural sociological questions are given, such as: average age of all farm operators reporting; number of farm operators 65 or more years of age; number residing on farm; number working off their farms; and number with "other income of family exceeding value of products sold."

Most of the information under "Specified Facilities and Equipment" is for 1959 only. Fortunately, data on "Use of Commercial Fertilizers and Lime" are given for 1959 and 1954. They include: number of farms reporting use and number of acres on which used. Data for 1959 only are included for: farms reporting use; number of acres fertilized; number of tons of dry and liquid materials respectively for three specified crops which vary from state to state, and for hay and cropland pasture, non-cropland pasture, and "all other" crops.

Much of this information by states and counties has been made available to fertilizer people through a wall map entitled "Use of Commercial Fertilizers by Farmers" and individual State tables by the ARCADIAN News.

Detailed data on livestock and poultry on farms; livestock and poultry products sold; and specified crops harvested in 1959 and 1954 are given in the census report. The information on crops harvested, when compared with amount of fertilizer used on specified crops, gives fertilizer people powerful sales data.

Data on types of farms, such as: field-crop farms — cash-grain, tobacco, cotton, and other field-crops; vegetable farms; fruit-and-nut farms; poultry farms; dairy farms; and livestock farms—are given for 1959 only.

Also, important data on number of farms in six economic classes: (1) farms with sales of $40,000 or more; (2) $20,000-$39,999; (3) $10,000-$19,999; (4) $5,000-$9,999; (5) $2,500-$4,999; and (6) $50-$2,499 are given for 1959 only. Similar data for part-time, part-retirement, and other, are also given.

Fertilizer people know that there are two important ways to increase the use of commercial fertilizers by farmers in their areas: First—convince more farmers that they should use fertilizers and second—show farmers who are now users how they can profitably use more fertilizers on their farms.

Much of the information in the 1959 Census of Agriculture reports indicates the size of this opportunity.

For example, in the 12 North Central States the percent of all farms using commercial fertilizers is 62.3%. If this could be increased to 81.2% (the figure for the "red" counties using 15,000 or more tons) the total amount of fertilizer used would be approximately one-third greater. This would come without an increase in the average amount of fertilizer used per farm.

If this average could be increased from the 1959 average of 7.6 tons per farm to 11.2 tons (the average per farm for the "red" counties) the total amount used would be about 47% greater.

Obviously neither of these goals could be achieved in one or two years, but it is reasonable to believe that total fertilizer use in these states could be increased by from one-third to one-half before the 1964 Census of Agriculture.

BEST N FOR YOUR N-P-K

Arcadian

NITROGEN

There are many reasons why it pays you to use ARCADIAN® Nitrogen Products in the manufacture of your mixed fertilizers. Here are only a few:

You are served by the leading producer of the most complete line of nitrogen products on the market. You have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You get formulation assistance and manufacturing advice from the best-qualified technical service staff in the industry. You benefit from millions of tons of nitrogen experience and the enterprising research that originated nitrogen solutions. You get many important bonus values when you make ARCADIAN Nitrogen the N in your N-P-K.

ARCADIAN
Nitrogen Products

NITRANA® Nitrogen Solutions
URANA® Nitrogen Solutions
DURANA® Nitrogen Solutions
U-A-S® Nitrogen Solutions
Anhydrous Ammonia
N-dure® Solution
A-N-L® Nitrogen Fertilizer
Ammonium Nitrate
UREA 45 Nitrogen Fertilizer
Sulphate of Ammonia
American Nitrate of Soda

Allied Chemical

NITROGEN DIVISION
MAIN OFFICE: 40 Rector St., New York 6, N. Y.

Positive Factors Outweigh Negative . . .

Future Seen Favorable for Greater Use of Pesticides and Fertilizers

By W. N. Thompson*

Professor of Farm Management
Department of Agricultural Economics
University of Illinois
Urbana, Ill.

THE FERTILIZER and chemical field is a rapidly changing one. The use of nitrogen in Illinois has increased eight fold in the past ten years, while use of soluble phosphate is two and one-half to three times as great and potash use has tripled. Rock phosphate has about held its own. A number of materials being used today were not being used only a few years ago. Today's most commonly used analyses of mixed fertilizers were of minor importance, or not used at all, ten years ago. The average analysis of the ten leading Illinois mixed fertilizer analyses was about 3-12-12 ten years ago but is now about 8-17-15. Changes in availability and use of chemicals for insect and weed control have been fully as dramatic.

At the same time, the businesses of those who buy these products and services have been changing rapidly. Farms have been increasing in size, and there has been a trend toward specialization in both crop and livestock production. Mechanization has increased and the increase in capital requirements has made financial management an important part of farm management.

Fertilizers and pesticides have played an important role in our changing agriculture—a role so important that the farmer has become highly dependent on the chemical industry. Many farmers would have nothing left above costs if they discontinued the use of fertilizers and other chemicals for just one year.

One might argue that the future must be optimistic for such an important segment of the agricultural industry. The future will undoubtedly show that the fertilizer trade, like farming, faces the challenge of change. The future will show that there were real opportunities in fertilizer and chemical businesses in the 1960's. At the same time, 1970 will show that those who were most successful were those who were able to foresee changes and best serve the ever-changing needs of their customers.

Let us take a brief backward look before attempting to get a more clear image of the economic picture of the future. The fertilizer and chemical business of the past 10 to 15 years has been one of great growth. This growth followed the coming of cheap synthetic nitrogen after World War II. At the same time, fertility levels of many Illinois soils were reaching the stage where they responded well to balanced fertility treatments. Farmers were in a strong financial position as measured by past standards. Many older farmers had farmed through a period of two wars and only one depression. The period from 1941 to 1951 was the best 11 consecutive years U.S. farmers had ever had from the standpoint of prices and incomes.

The 1950's were years of competitive change. In general, there were pressures on corn-belt prices. There was the struggle to adjust the incentive support price levels of World War II to peacetime levels. Farmers were looking for ways to lower per unit costs of production. For many farmers fertilizer and other chemicals were the solution to this economic puzzle. The relative price stability of fertilizer was important in its rapidly growing use.

This brief backward look must lead to the conclusion that we will not repeat the past. The farmer is in a new era!

Economics of the Future

One can best outline the economic picture and fertilizer and chemical use by separating the forces involved into two groups—the unfavorable and the favorable. Both sets of forces are challenging. In fact, while characterizing the 1950's as a decade of competitive change, the decade of the 1960's could be characterized as one of constant challenge.

Unfavorable Forces

1. **First are the abundant supplies of feed, which are at record levels.** The carryover of feed grains has increased each year since 1952. Production has exceeded utilization by an annual average of five percent. Increases in carryover have been entirely in stocks under government loan or owned by the Commodity Credit Corporation. These supplies are certain to exert a downward pressure on prices and incomes.

I would not want to seem overpessimistic. Perhaps it would be better to be cautiously optimistic. The rate of feed-grain utilization is quite high. Use during the past two years and expected use during the current marketing year are higher than production for any year before 1958. The future for livestock prices looks somewhat more favorable than the future for grain prices, although livestock producers will be faced with problems of low prices seasonally and cyclically.

2. **Second, competition for farmers' dollars will continue.** Farmers will have many places to put their dollars—for either production or consumption. Farmers' living levels are considerably higher than they were a few years ago, and many items in the family's budget are tending to become "fixed costs." Studies of farm family account records indicate that farm families are reluctant to reduce their living levels.

Favorable Forces

Favorable forces seem to outnumber the unfavorable ones, but all of them are not equally important. The following forces would seem to encourage the use of fertilizers and chemicals:

1. **The emphasis on high-profit crops.** Farmers have been growing the crops that produce the most feed and provide the highest income per acre. The better land areas will be farmed even more intensively in grain crops. In general, these are the crops that provide the best market for fertilizers. These crops cannot be produced at profitable yield levels without substantial amounts of fertilizer. High yields of the high-profit crops will further deplete the mineral levels of some soils, making the use of larger amounts of fertilizer profitable.

2. **Fertilizers and chemicals the key to low per unit cost.** The pressure on farm prices and income will encourage farmers to search for ways to lower per unit costs of production. Fertilizers and chemicals still have an important role to play in achieving this goal. Chemicals that will lower per acre as well as per unit costs will be most attractive to farmers.

3. **Opportunities to use fertilizers and chemicals in optimum amounts.** In spite of the rapid increase in fertilizer and chemical use, there are few farmers who could not make fuller use of fertilizers and chemicals. In the past period of relatively good incomes, we have tended to think in terms of high average returns per dollar spent on fertilizers and chemicals. In the future we will think more in terms of equating the additional (marginal) returns with additional cost of fertilizer and chemicals.

4. **The continuing demand for services.** Farmers will be willing to pay for services—particularly those that encourage timeliness of crop production and make labor more productive. The future will see more emphasis on efficiency in use of labor on farms. The farmer gets the greatest return per hour of labor in crop production; therefore, he should be encouraged to make the best use of his labor at critical times.

5. **Income from other than farming.** An increasing number of farm families have important sources of off-farm income. More farm operators are working off the farm a large proportion of the time. This nonfarm income will lessen the pressure to reduce expenditures for farm supplies.

6. **The place of government programs in fertilizer and chemical use.** With the uncertain future of government programs for agriculture, it would be risky to predict that they would encourage the use of fertilizers and chemicals. But that seems entirely possible; at least it is safe to say that government programs will not discourage fertilizer and chemical use over a period of years. A program designed to cut sharply into the government stocks of feed grains would reduce fertilizer use in the corn belt.

Some kind of price support program for feed grains seems certain. The level will not be so high as some farmers would like, but it will be high enough to put a floor under efficient producers and thereby encourage fertilizer and chemical use. We are a long way from strict bushel quotas. The emphasis in "supply management" will center around land. Any corn-belt land that is "retired" will be the poorer quality land that is not now receiving much fertilizer. Any program of supply management restricting use of land will encourage use of fertilizers and chemicals on land that is not in the program.

7. **Better farm managers.** The farmer will become an increasingly better businessman. He will be more cost conscious, but he will be more

*From talk, "The Economic Picture and Fertilizer and Chemical Use" presented to recent Agricultural Industries Forum, University of Illinois.

SERVE ALL YOUR FERTILIZER CUSTOMERS BETTER

SPREADING ACCURACY FOR SMALL OR BIG JOBS

2-4 TONS

Model N-28 (2 ton) and the N-48 (4 ton) shown, have unique no-spring, individual wheel suspension—all wheels carry equal weight at all times. These tractor pulled "compacts" make money as rental units.

GET THESE SIMONSEN TROUBLE-FREE FEATURES

- Stainless Steel Apron
- Stainless Steel on all Critical Corrosion Points
- All-Weather Wheel Drive

4-13 TONS

Model P710 shown, has a 7 ton capacity. Other "P" models available from 4 to 13 tons. All "P" models are available in 3 spreading widths, and can accurately spread by test—75 lbs. per acre on up.

WRITE, WIRE OR PHONE COLLECT

for further information about the P710 and the N-48, plus a full line of other bulk fertilizer spreaders and bodies, bulk feed bodies, bulk and sack bodies and unloaders.

S

SIMONSEN MANUFACTURING CO.

Dept. CL QUIMBY, IOWA Phone 72

receptive to supplies and services that will fit into his business and give him some return for his time and effort. It is only such supplies and services that will encourage the farmer to remain as a steady customer.

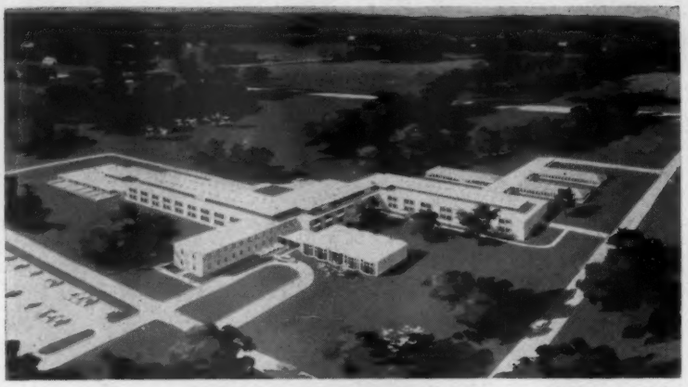
The favorable forces seem to far outweigh the unfavorable ones in the economic picture for fertilizers and chemicals. Rates of growth in the over-all fertilizer business will be slower than in the past. But there are sure to be improvements in the products, and those in the business will find ways to be of more service to farmer customers. It is entirely possible that use of chemicals for weed and insect control may expand even more rapidly in the future than they have in the immediate past. The future of those in the business of supplying farmers will depend in large part on being able to provide the desired supplies and services at reasonable cost.

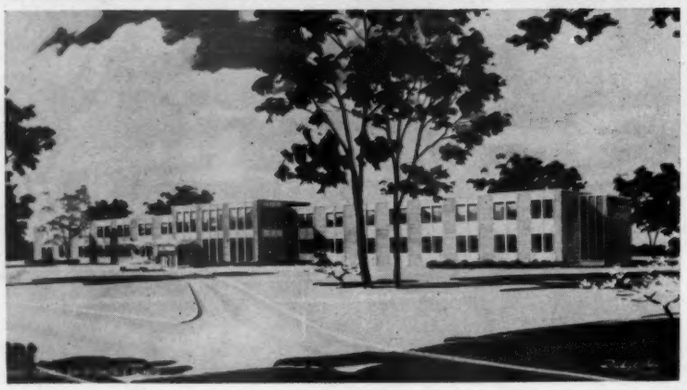
Pesticide Laws Presented In New CSMA Book

A new edition of the "Compilation of Economic Poisons (Pesticides) Laws" has been published by the Chemical Specialties Manufacturers Assn., to bring together Federal and State laws and regulations of special interest to manufacturers, packagers and sellers of insecticides, fungicides, rodenticides, disinfectants, sanitizers and related products. It also includes the model law and related laws applicable to economic poisons.

Produced in looseleaf form, additions will be prepared as often as sufficient changes warrant and offered to all having the original volume.

Cost of the book is $48 a copy in the United States and Canada and $49.00 in other countries. Orders will be handled by the Chemical Specialties Manufacturers Assn., 50 East 41st Street, New York 17, N.Y.





AGRICULTURAL CENTER—American Cyanamid Co. expects to move its agricultural division to the above site in Princeton, N.J., about Sept. 1. The upper picture is artist's view of the research and science building, complete with laboratories and greenhouse facilities, and below is the administration building. Approximately 500 people will comprise the employee group at the new agricultural center when it is completed.

American Cyanamid Co. Prepares for Move To New Agricultural Center in New Jersey

Executive offices of American Cyanamid agricultural division will be moved to its new agricultural center on or about September 1, 1961, according to C. D. Siverd, general manager of the division.

Research and development groups formerly located at Cyanamid's Stamford, Conn., and Pearl River, N.Y., laboratories will relocate prior to the September date. The division's marketing, manufacturing, technical service, accounting, personnel, and other service groups now located in New York City will move in shortly after the research and development personnel.

The 640-acre tract on which the agricultural center is situated is three miles southwest of Princeton. The new center combines facilities for laboratory research and development work with practical field-testing conditions available.

Research efforts at the center will be directed toward the development of new and improved products for animal and plant production and protection. Later this summer, scientists and staff will move into a two-story brick research building, now nearing completion, comprised of three major wings, each devoted to a different phase of agricultural research . . . animal science, plant science, and chemistry.

Cultivated fields and facilities are available to carry out studies involving insecticides, nematocides, fungicides, herbicides, and plant food studies.

The administration building, designed to house over 200 people, is scheduled for completion by September and matches in architectural design the research building. Both buildings are located in a campus-like setting and were designed by Voorhees, Walker, Smith, Smith and Haines, New York architects.

Approximately 500 people will be employed at the new agricultural center when it is fully staffed.

Heart Attack Fatal to Royster Executive

George Graham Miller, 48, assistant general sales manager for northern and midwestern territories, F. S. Royster Guano Co., Norfolk Va., died unexpectedly of a heart attack July 19. He joined Royster as manager of Royster Chemical Works, Toledo, Ohio in 1938 and continued in that position until the dissolution of the chemical works in the early 1950's.

He then became assistant sales manager of F. S. Royster Guano Company's Toledo office, which serves most of Ohio and the Michigan peninsula. In 1955 he became Toledo sales manager, and in 1957 was appointed assistant general sales manager.

Packaging Symposium

The second Symposium on Packaging of Chemical Products, sponsored by the chemical packaging committee of the Manufacturing Chemists' Assn., has been scheduled for March 13-14, 1962 at the Chase-Park Plaza hotels, St. Louis, Mo. Arrangements for the symposium are under the direction of Robert F. Uncles, chairman of the symposium committee and manager of the packaging and labeling section of American Cyanamid Co.

THE CHIEF LINE OF

SELF-UNLOADING BULK TRANSPORTS FOR MORE PAYLOAD PER MILE AT LESS COST PER MILE

Sturdy, big capacity Chief self-unloading bulk transports mean extra profit in your hauling operation. Streamline designed to let you transport larger payloads! Quality construction reduces maintenance costs to cut your cost per mile. There's a Chief self-unloading bulk transport specifically built and priced for your hauling operation.

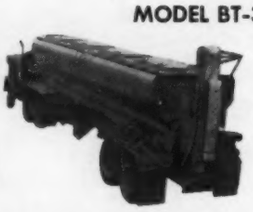
MODEL FT-300

The ideal unit for sand, salt, fertilizer, lime, feed, coal, clay, etc. Fully hydraulic—streamlined for easy pulling. Your choice of power . . . air cooled 30 h.p. gas engine mounted on trailer—fully enclosed . . . or power take-off mounted on tractor.

MODEL BBT-500

The top bag and bulk combination—push-button operation—completely self-unloading—large 9"—12"—9" auger systems—plus hydraulic sliding compartment dump doors. Unloads over a ton per minute.

MODEL BT-300



Features full hydraulics—"Push-Button" control—twin floor augers—hydraulic sliding compartment dump doors.

MODEL BB-71-T

New! Front Mounted fully hydraulic system . . . mounts into your present transport—or can be supplied complete with grain body as shown. Loads and unloads hydraulically.

PROVE TO YOURSELF WHY HENDERSON CHIEF TRANSPORTS ARE FIRST IN QUALITY, FIRST IN ECONOMY OF OPERATION. LET OUR ENGINEERS MAKE A DETAILED ANALYSIS OF YOUR REQUIREMENTS AT NO OBLIGATION.

HENDERSON MFG. CO.
P.O. Box 40, Dept. E68
Manchester, Iowa

"ASK THE MAN WHO DRIVES A CHIEF"

I WOULD LIKE COMPLETE INFORMATION, PRICES ON THE FOLLOWING HENDERSON CHIEF SELF-UNLOADING BULK TRANSPORTS

☐ BBT-500 ☐ BB-71-T
☐ BT-300 ☐ FT-300

Distributorships still welcome in some preferred areas.

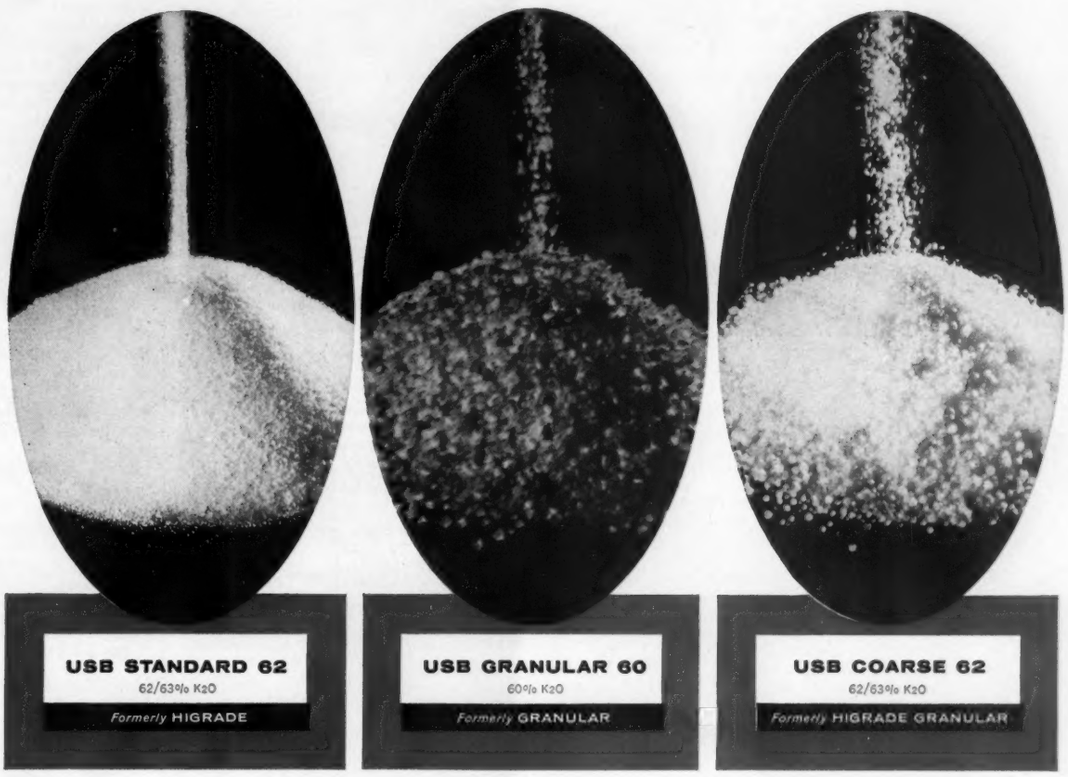
Name _____
Company Name _____
Address _____
City _____
State _____

COMPLETE LINE OF SELF-UNLOADING BODIES

Manufactured by Henderson MFG. CO. MANCHESTER, IOWA

Buy and Sell...Croplife...Want Ads

3 types of POTASH specially sized for you...



To make the best fertilizers...

Each of our three types of high quality muriate of potash is ideally sized to meet your particular manufacturing requirements. Both of the white grades – STANDARD and COARSE – contain the highest possible K_2O (62/63%) and make feasible the manufacture of the highest analysis mixtures. Our GRANULAR 60 is ideally suited for mixtures requiring muriate of a larger particle size . . . or for direct application. All three products are refined to assure free-flowing and non-caking properties during handling and storage.

For nearly thirty years our products and services have kept pace with your exacting needs. Call, telex or wire one of our nearby offices for prompt delivery.

ATLANTA
1627 Peachtree St., N.E. / TRinity 6-7515
CHICAGO
3456 Peterson Avenue / INdependence 3-6262
LOS ANGELES
630 Shatto Place / DUnkirk 7-5151

U.S. BORAX

50 ROCKEFELLER PLAZA, NEW YORK 20, N.Y. / JUdson 2-6262

Agronomic Briefs

From the Experiment Stations

Many Texas farmers can increase their net income significantly by utilizing more fully presently known technology, according to John E. Hutchison, director of the Texas agricultural extension service. He said that farm families could increase their annual net income at least $100 million by using the most advanced technological and management practices. Mr. Hutchison's statement followed an evaluation of first-year results in extension's intensified soil fertility program launched early in 1960.

Initially, 12 counties representing different major land resource areas were selected to participate in the pilot project. Emphasis was given to crop production practices, including the use of fertilizer based on soil tests, planting the best varieties of crops, effective insect and disease control, appropriate soil and water conservation measures and other practices based on the best research information available.

Results showed increased net income ranging from $1.86 an acre to $52.07 an acre. In one county, Red River, 47 demonstrations indicated that net income of the county could be increased $2.9 million if all farmers followed recommended practices.

•

Ability of American farmers to produce in excess of present needs is a matter of domestic concern but is the envy of the rest of the world, reports an Oregon agricultural leader who returned recently from a year's assignment in Southeast Asia.

Food shortages in Red China, Russia, Soviet satellites, as well as widespread areas of the Free World are throwing a different light on food surpluses in this country, says Robert W. Henderson, assistant director of Oregon State University agricultural experiment station.

Mr. Henderson returned recently from 14 months in Thailand as chief adviser of the OSU technical assistance staff at Kasetsart University and also visited other areas that are striving to boost agricultural production.

While U.S. scientists and technicians are in demand throughout the world to help transplant technological advances in agriculture, he said, it is important that "we also place full value on continued advances in this country."

In view of the so-called population explosion now underway, we must be looking ahead to our potential to produce in the next decade or two, Mr. Henderson observed. That is the time normally required for scientific findings and new principles to gain large scale acceptance throughout agriculture.

•

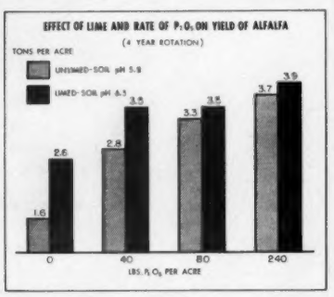
The need for greater quantities of lime to complement larger use of fertilizer was pointed out in a recent "Potash News Letter" by Werner L. Nelson, Midwestern director of the American Potash Institute.

Dr. Nelson points out that limestone usage reached a peak in 1947, then dropped sharply. "Since 1953 there has been little change in overall usage," he said. "Yet N, P_2O_5 and K_2O have made remarkable increases since 1947. The increased use of nitrogen and higher crop production intensify the need for lime.

"Many nitrogen fertilizers leave an acid reaction in the soil and continued use of high amounts makes the soil more acid. This combined with leaching of lime means that every year we are falling further and further behind and creating a more and more unbalanced condition."

Despite application in the Midwest of 70% of all limestone applied in the U.S., agricultural leaders estimate that this area still uses less than one-third of the amounts needed to build and maintain desirable soil levels. Some states, the report said, need from two to ten times present usage for optimum benefit.

Below is Dr. Nelson's arguments for the use of lime. He maintains it is a bargain because it "does so many jobs in acid soils. It has invaluable direct and indirect effects on the availability of plant food."



HOW LIME HELPS—By releasing soil phosphorus, lime increases yields of alfalfa particularly on the O and 40 lb. P_2O_5 plots as shown in the above chart by the American Potash Institute.

Here is what the use of lime accomplishes, according to Dr. Nelson:

- Adds calcium and sometimes magnesium—two essential nutrients. Calcium links pectic acids thus "cementing" cells together. Magnesium is the "heart" of the chlorophyll molecule.
- Increases the pH which permits growing of legumes and improves capacity to fix nitrogen.
- Improves availability of soil and fertilizer nutrients. (See chart.)
- Reduces toxicity of iron, aluminum, and manganese. Heavy band fertilization of corn on acid soils may develop a localized area of very high acidity and soluble manganese.
- Increases availability of molybdenum.
- Increases microbiological activity thus speeding up decomposition of crop residues and releases nutrients.
- Leads to improved physical condition of soil because of high crop yield and more crop residues.

•

P. J. Bergeaux, agronomist of the University of Georgia extension serv-

Just Say DUVAL That's All

and get both automatically

Continuing research and development assure you of consistently fine quality. Continuing recognition of the industry's need for dependable deliveries assures you of consistently fine service—same day shipment.

DUVAL MURIATE OF POTASH
SULPHUR

Produced by
DUVAL SULPHUR & POTASH COMPANY

Exclusive Sales Agent
ASHCRAFT-WILKINSON CO.
ATLANTA, GEORGIA

Norfolk, Va. • Charleston, S. C. • Tampa, Fla. • Jackson, Miss. • Columbus, Ohio • Montgomery, Ala. • Des Moines, Iowa

ice, says that following soil test nitrogen recommendations for corn can mean a return of $3 for every extra dollar invested in additional nitrogen. He calls attention to results of a series of small plot nitrogen demonstrations on corn in 12 Georgia counties in 1960.

County agents selected corn fields from which a soil test had been made and lime and fertilizer recommendations were followed. The average per acre yield on the demonstration plots was 82 bu. The cooperating farmers applied 83 lb. nitrogen to the check plots which produced 70 bu. of corn per acre.

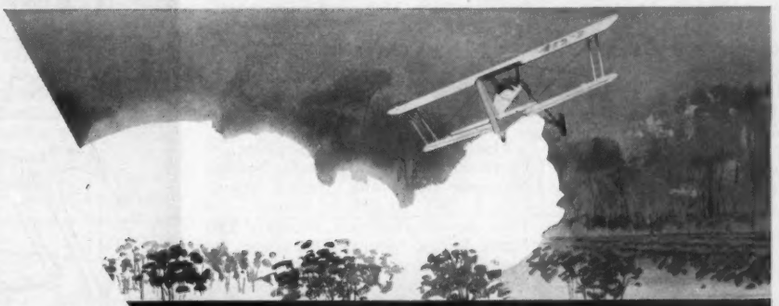
An additional 37 lb. nitrogen applied to the demonstration plots resulted in an increased yield of 12 bu. an acre. The additional $4.45 worth of nitrogen returned $13.20 an acre in increased corn yields, a return of approximately $3 for each additional dollar invested.

●

Profitable crop production depends on high yields under the present cost-price relationship, reports the Midwest division of the National Plant Food Institute, in summarizing a statement by Dr. Paul R. Robbins, Purdue University agricultural economist.

"The job of getting those high yields cannot be done by fertilizer alone," says Dr. Robbins. "Good management practices must accompany the plant food if profitable response is to be obtained. On most farms, however, it takes rather liberal applications of fertilizer to maintain high yields over any extended period of time."

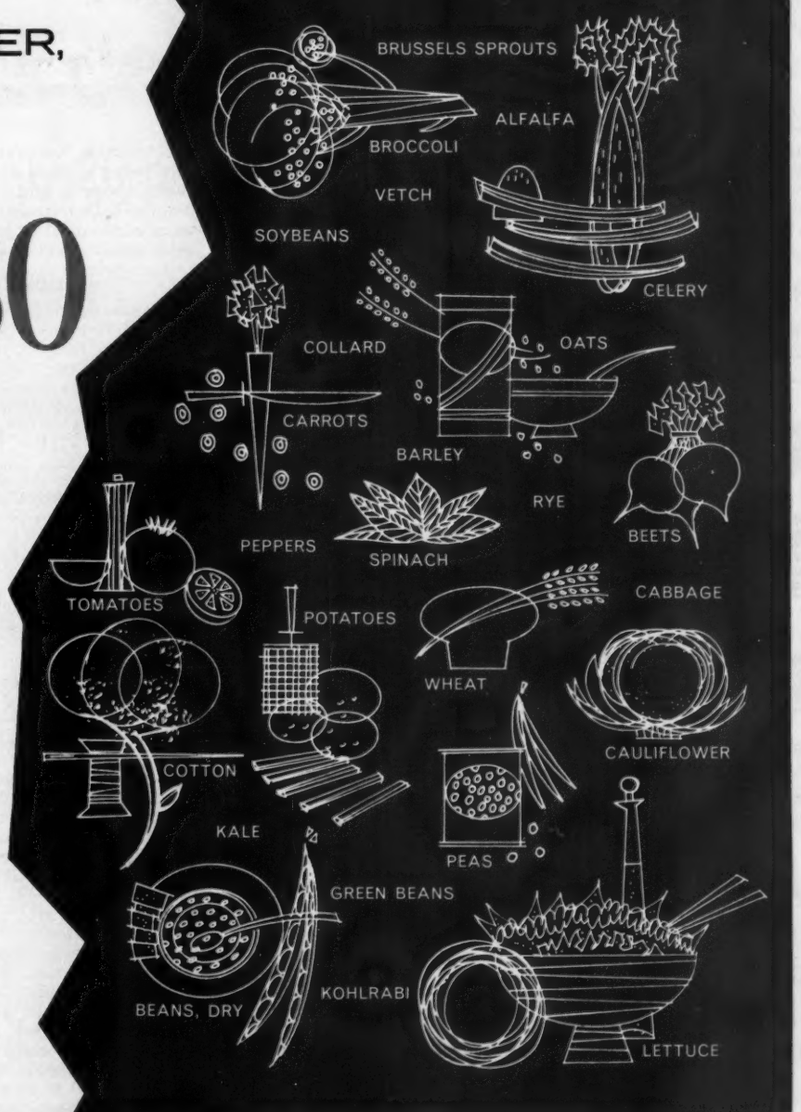
Dr. Robbins points out that fertilizer continues to be a good buy. "During the decade of the 1950's, fertilizer prices increased only about 5%, while Indiana farm land prices were climbing about 75%, and farm wage rates 48%," he says. "This means that farmers should be using more fertilizer in relation to land, labor and machinery than they were using 10 years ago."



DUSTS
STAY STRONGER
FLOW FREER
FORMULATE FASTER,
BETTER
WITH

VICTOR
STABILIZED T80

METHYL
PARATHION



Methyl parathion dusts stay at top field strength when you formulate with Victor's new Stabilized T80*.

Stabilized T80 is less sensitive to heat and hydrolysis...less likely to lose strength due to catalytic activities of certain clays.

Less solvent means less liquid to absorb and less spray time in formulating both dust concentrates and field strength dusts. With Stabilized T80 your formulations are "drier," more free flowing, subject to less weight loss through evaporation.

For more complete information write to Victor Chemical Works for your free copy of our report, "Victor Stabilized T80."

*Victor's stabilized methyl parathion, 80% technical.

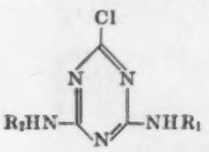
VICTOR Chemicals
DIVISION OF STAUFFER CHEMICAL COMPANY
155 N. Wacker Drive, Chicago 6

PRODUCTION PROCESS PATENTS

2,992,090

Herbicidal Pellets. Patent issued July 11, 1961, to Clarence A. Littler, Wilmington, Del., assignor to E. I. duPont de Nemours & Co., Inc., Wilmington.

Dense, rapidly disintegrating herbicidal pellets having a high dry-strength, made by extrusion and having a density of from 1.2 to 1.7 grams per cubic centimeter, said pellets comprising from about 10 to 75 parts by weight of herbicidally active s-triazine represented by the formula



where R_a and R_s are the same or different and are selected from the group consisting of alkyl of less than 4 carbons and $-(CH_2)_n-OCH_3$, and n is an integer selected from the group consisting of 2 and 3, said s-triazine having an average particle size of less than about 20 microns, from about 18 to 85 parts by weight of non-gelling calcium-magnesium montmorillonite clay having an average particle size of less than about 325 mesh, from about 5 to 25 parts by weight of anhydrous sodium sulfate having an average particle size of less than about 100 mesh, and from about 0.25 to 2.0 parts by weight of anionic wetting agent having an average particle size of less than about 20 microns, the total parts by weight in any one composition being 100.

2,991,170

Process for the Manufacture of Fertilizers Containing Water-Soluble Nitrogen Compounds. Patent issued July 4, 1961, to Karoly Szepesi, and Tibor Jancso, Budapest, Hungary, and Jozsef Varga, (deceased). Process for the manufacture of nitrogen-containing fertilizers which comprises absorbing nitrogen oxide gases with an equeous suspension of hydrosilicate selected from the group consisting of montmorillonite, bentonite, vericulite, glauconite and illite, and neutralizing the acid slurry so obtained with ammonia.

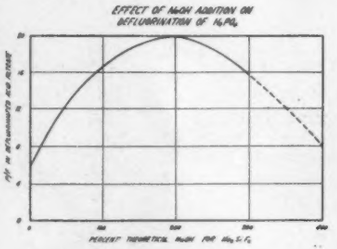
2,992,089

Herbicidal Process. Patent issued July 11, 1961, to Leonard W. Melander, St. Paul, Minn. and Stanley R. McLane, Prospectville, and Melvin L. Sutherland, Lafayette Hill, Pa., assignors to Amchem Products, Inc., Ambler, Pa. A method of herbicidally treating plant growth which comprises applying to the plant growth a mixture of 3-amino-1,2,4-triazole and an inorganic salt of thiocyanic acid which yields thiocyanate ions, said salt being applied at a rate of between about ½ and 12 lb./acre, said 3-amino-1,2,4-triazole being used in an amount sufficient to provide herbicidal action when so applied.

"Have you been sweeping dirt from my shoes under the rug again?"

2,992,914

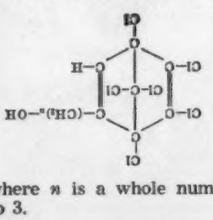
Phosphatic Materials and Methods for the Production Thereof. Patent issued July 18, 1961, to Paul D. Manning, Pasadena, Cal., and Ira M. LeBaron, Evanston, Ill., assignors to International Minerals & Chemical Corp.



A process for producing from phosphate rock, a granular, non-hygroscopic, free-flowing fertilizer containing a high percentage of phosphorus pentoxide which is substantially completely available, said phosphorus pentoxide being present in both water-soluble and water in-soluble form and, hence, available to plants both immediately and also throughout the various stages of growth, which process consists essentially of: (1) Continuously mixing and agitating phosphate rock ground to a particle size such that about 50% to about 85% thereof will pass through a 200 mesh screen with 65% to 70% aqueous sulfuric acid, said sulfuric acid being employed in an amount equal to about 115% of that required to form monocalcium phosphate from the phosphatic material contained in said rock and to react with the impurities contained in said rock, said mixture being agitated for not more than about 4 minutes; (2) discharging the agitated mixture onto a continuously moving conveyor and maintaining said mixture on said conveyor for about 20 to 30 minutes to permit said mixture to initially set; thereafter discharging said mixture in initially set condition onto a curing pile and storing said mixture in said curing pile for about 5 to 15 days to produce a cured phosphate material which is friable and porous and which, without prior mechanical disintegration, is easily slurried with an aqueous medium; (3) forming an initial aqueous slurry of said cured phosphate material containing about 35% to about 40% solids; (4) agitating said slurry for a short period of time to form a liquid phase containing about 20% to about 33% dissolved solids and about 67% to about 80% water; (5) heating said slurry to an elevated temperature not in excess of 60 degrees C. and separating said liquid phase from the non-dissolved solid materials contained in said slurry and adding to said separated liquid phase a small amount of limestone; (6) thereafter introducing said liquid phase into a load, recirculating through a drier, of particulate solid phosphate material resulting from the prior dehydration of similarly obtained liquid phase compositions, said liquid phase being added to said recirculating load in an amount such that the resulting combination does not contain more than about 15% of moisture, there being employed one part of said liquid phase for each 4 to 10 parts of solids in said load; (7) introducing said combination into said drier while said drier is operated at a temperature of about 150° C. to about 230° C. and maintaining said combination in said drier for a time period sufficient to effect reduction of the moisture content thereof to between about 1% and about 5% by weight and to produce at a temperature not in excess of 200° C. a granular, non-hygroscopic, free-flowing product containing about 55% to about 58% phosphorus pentoxide of which about 35% by weight is water-in-soluble, said available phosphorus pentoxide constituting substantially the entire amount of phosphorus pentoxide present in said product.

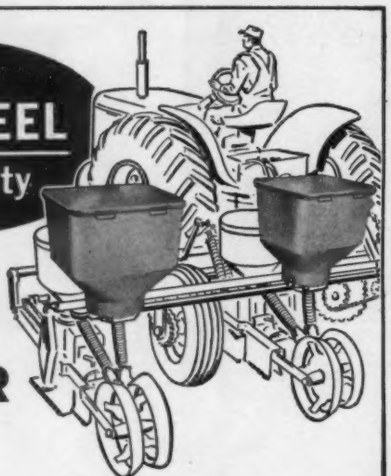
2,993,076

Production of Pesticidal Compounds. Patent issued July 18, 1961, to Hyman M. Molotsky, Chicago, Ill., assignor to Velsicol Chemical Corp., Chicago. A compound of the formula



where n is a whole number from 1 to 3.

You can SEE and FEEL its superiority



MFG FERTILIZER HOPPER

Glass-smooth, seamless unit . . . has molded-in color; never needs paint; won't rust or corrode from wear or weather.

Translucent . . . reveals level of contents at a glance.

Durable . . . withstands impact and abrasion of dry mixes. Stronger than steel, pound for pound. Easily repaired if it ever is damaged.

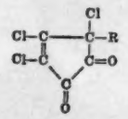
Special sizes and shapes can be custom molded for your specific needs. Write for details.

MOLDED FIBER GLASS BODY COMPANY

4643 Benefit Avenue • Ashtabula, Ohio

2,992,968

New Fungicidal 3-Heterocyclic-3,4,5-Trichloro-4-Cyclopentene-1,2-Diones. Patent issued July 18, 1961, to Sidney B. Richter, Chicago, Ill., assignor to Velsicol Chemical Corp., Chicago. A compound of the formula



A method of destroying undesirable fungi which comprises contacting such fungi with a fungicidal composition comprising an inert carrier with the active ingredient.

2,992,913

Herbicidal Composition and Method Employing a Combination of a Polychlorobenzoic Acid and a Phenoxyaliphatic Acid. Patent issued July 18, 1961, to Rudolph Koloman Pfeiffer, Cambridge, England, assignor to Fisons Pest Control Ltd., Felixstowe, England.

A composition for the control of weeds in crops which comprises a mixture of (*a*) at least one cholorbenzoic compound selected from the group consisting of 2:3:6-trichlorobenzoic acid, 2:3:5:6-tetrachlorobenzoic acid, 2:6-dichlorobenzoic acid and salts thereof and (*b*) at least one phenoxyaliphatic hormone weedkiller compound selected from the group consisting of 2:4-dichlorophenoxyacetic acid, 2-methyl-4-chlorophenoxyacetic acid, 2:4:5-trichlorophenoxyacetic acid, gamma-2-methyl-4-chlorophenoxybutyric acid, gamma-2:4-dichlorophenoxybutyric acid, alpha-2-methyl-4-chlorophenoxypropionic acid and salts of said compounds; said composition containing a weight ratio of chlorobenzoic compound to phenoxyaliphatic hormone weedkiller compound of from about 1:0.25 to about 1:32.

2,993,923

Preparation of Cuprous Tertiarybutyl Sulfonium Chloride and its Use as a Selective Herbicide. Patent issued July 25, 1961, to Paul F. Warner and Bradford L. Archer, Phillips, Tex., assignors to Phillips Petroleum Co. The preparation of cuprous tertiarybutyl sulfonium chloride which comprises reacting together cuprous chloride and ditertiarybutyl sulfide.

Industry Trade Marks

The following trade marks were published in the Official Gazette of the U.S. Patent Office in compliance with section 12 (a) of the Trademark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. (See Rules 20.1 to 20.5.) As provided by Section 31 of the act, a fee of $25 must accompany each notice of opposition.

Diparin, in capital letters, for chemical compound incorporated as an ingredient in the manufacture of insecticides. Filed June 9, 1959, by Geigy Chemical Corp., Ardsley, N.Y. First use May 18, 1959.

Nature's Way, in capital letters, for fertilizers and soil conditioners. Filed May 16, 1960, by Fred A. Veith, Cincinnati, Ohio. First use on or about Nov. 1, 1957.

Pearl-E-Peat, in capital letters, for soil conditioner. Filed May 26, 1960 by Tennessee Products & Chemical Corp., Nashville, Tenn. First use May 13, 1960.

Frillon, in capial letters, for weed and brush killers. Filed June 22, 1960, by The Dow Chemical Co., Midland, Mich. First use May 19, 1960.

Super Green, in capital letters, for phosphoric acid for further manufacturing use. Filed July 26, 1960, by Western Phosphates, Inc., Salt Lake City, Utah. First use Dec. 31, 1959.

Ferti-Liquid, in capital letters, for liquid fertilizer. Filed Oct. 4, 1960, by Clover Chemical Co., Pittsburgh, Pa. First use on or about July 1, 1953.

Dormal, in capital letters, for seed inoculants. Filed Oct. 17, 1960 by Agricultural Laboratories, Inc., Columbus, Ohio.

Methyl Trithion, in capital letters, for insecticide-acaricide. Filed May 12, 1960, by Stauffer Chemical Co., New York. First use March 17, 1960.

Design, with letters CFS on shield, for dormant spray for fruit trees and also used with other insecticides or fungicides. Filed July 5, 1960, by California Farm Supply Co., Berkeley, Cal. First use Dec. 31, 1956.

Gesamil and Ipatone, in capital letters, for active chemical ingredient incorporated and used in the manufacture of herbicides. Filed Aug. 5, 1960, by Geigy Chemical Corp., Ardsley, N.Y. First use for both, July 13, 1960.

Spectro, in capital letters, for active chemical ingredient incorporated and used in the manufacture of insecticides. Filed Aug. 5, 1960, by Geigy Chemical Corp., Ardsley, N.Y. First use July 13, 1960.

Mousers, in capital letters, for pesticides. Filed Oct. 7, 1960, by M. F. A. Oil Co., Columbia, Mo. First use Sept. 9, 1960.

Cynem, in capital letters, for dithiophosphate for use as a nematocide, insecticide, acaracide, ovacide and rodenticide. Filed Oct. 28, 1960, by American Cyanamid Co., New York. First use Sept. 15, 1960.

Smak, in capital letters, for insecticide. Filed Nov. 28, 1960, by Chemical & Electronic Research Corp., Baltimore, Md. First use July 2, 1960.

Drawing of sailing vessel, with words Sea-Born in script, for liquified sea weeds as plant food, sea weed meal as soil conditioner, and sea weed meal as animal feed supplement. Filed Sept. 14, 1960, by Joakim Lehmkuhl, doing business as Sokd Co., Greenwich, Conn. First use April 22, 1960.

Drawing of Elephant with word Cominco on front, for fertilizers. Filed Sept. 28, 1960, by Consolidated Mining and Smelting Co. of Canada, Ltd., Trail B.C., Canada. First use on or about March 10, 1960.

Gard-N-Stik, in hand-drawn capitals on three lines, for fertilizer. Filed Dec. 28, 1959, by Gansco Products Ltd., Toronto, Ont., Canada.

Prometone, in capital letters, for chemical compound used in the manufacture of herbicides. Filed May 29, 1959, by Geigy Chemical Corp., Ardsley, N.Y. First use April 29, 1959.

Regione, in capital letters, for insecticides, fungicides, herbicides. Filed Sept. 15, 1960, by Plant Protection Ltd., Yalding, England.

Greenfield, in capital letters, for crabgrass killer. Filed Dec. 12, 1960, by Eli Lilly & Co., Indianapolis, Ind. First use Nov. 18, 1960.

See what you get... and can Guarantee

with only 20 pounds of F·T·E Fritted Trace Elements to a ton of fertilizer

Percent to total, by weight	FTE FORMULA 501	FTE FORMULA 502
B BORON	.02	.028
Cu COPPER	.02	.02
Zn ZINC	.04	.04
Mn MANGANESE	.049	.097
Fe IRON	.12	.039
Mo MOLYBDENUM	.0013	.0013

You get all six minor elements in a single product—and as little as 1% in your mix will meet most requirements for trace-element additives.

Being *fritted* and slowly soluble at a controlled, predetermined rate, FTE won't leach out—or become fixed in the soil. It stays in the root zone and releases the nutrients as needed, all through the growing season.

Two standard formulas are immediately available. Others are being developed for specific areas of the country. All can be *safely used anywhere*, and on *any crops*, simplifying both manufacturing and marketing of fertilizers.

If you're not now using FTE, you'll find it profitable to do so. It costs but little, and can make a big difference—in the results your customers get; in your own future sales and profits.

FERRO **FERRO CORPORATION** *Agricultural Division*

4150 East 56 Street • Cleveland 5, Ohio

How 2,4-D Actually Kills Plants Subject of Continuing Research

DESPITE some 16 years of successful application in making money for farmers, the exact way in which 2,4-D kills plants is still not known, although many theories have been proposed. Experiments under way at the University of Illinois, (one of a number of institutions interested in finding out more about this herbicide), have been described by F. W. Slife and J. B. Hanson, respectively of the crop production and plant physiology departments of the university.

In a recent edition of "Illinois Research," the two authors tell about their work and discuss findings in connection with the mode of action of 2,4-D.

They explain that radioactive 2,4-D is being used to study the penetration, translocation, and rate of breakdown of 2,4-D in plants. "We have found that resistance to 2,4-D cannot be explained by lack of penetration or translocation of the compound," they report. "Although wild cucumber is resistant, 2,4-D could penetrate and be translocated through the plant.

"After these results, we made further studies on wild cucumber to learn what happens to 2,4-D once it has entered the plant. After 24 hours only 18% of the 2,4-D in the plant was still 2,4-D. The rest had been converted to other compounds. Some of the applied 2,4-D had been given off as $C^{14}O_2$, indicating that the 2,4-D molecule was broken down.

"The action of 2,4-D was then compared with that of 2,4,5-T, a compound to which wild cucumber is sensitive. Like the 2,4-D, the 2,4,5-T was applied in radioactive form. Less of the 2,4,5-T than of the 2,4-D penetrated the plant. What did penetrate, however, was readily translocated. After 24 hours, 78% of the 2,4,5-T in the plant was still pure 2,4,5-T, indicating that it was much more resistant to breakdown than 2,4-D in this particular species.

"These studies indicate that resistance to 2,4-D may be closely correlated with the rate at which the plant can break down the 2,4-D molecule.

"The herbicide 2,4-D is a synthetic growth hormone, or auxin. In plants that do not readily break down 2,4-D, the compound produces growth aberrations which lead ultimately to death. The clue to its action must therefore lie in the abnormal growth produced. Indeed, the common witticism, 2,4-D makes plants grow themselves to death, is basically sound. But what is growth, and how does 2,4-D modify it?

"Growth in plants is a two-phase process. At the tip of roots and shoots are meristematic regions—that is, the cells can divide to produce new cells. Some unknown stimulus, probably hormonal, keeps these cells ever young, ever dividing. After a cell divides, the more basal of the two daughter cells escapes the 'ever young' influence and embarks on the second phase of growth.

"During this phase a cell grows in length. A low concentration of indolacetic acid, a growth hormone found in the plant, influences this elongation. As the cell elongates and matures, it synthesizes considerable protein and lipid, and becomes more efficient in such physiological processes as salt uptake, translocation, and respiration.

"When 2,4-D is sprayed on a susceptible seedling or young plant, the normal growth pattern changes markedly. Meristematic cells quit dividing—as if the cell-division mechanism were suddenly fixed in place. Elongating cells no longer grow longer, but do grow wider.

"All these changes produce a plant with little or no root elongation, and with abnormal growth in the basal stem. Young leaves will not expand properly, but develop an abnormal, compact mesophyll (green tissue between the epidermal layers of a foliage leaf) that is low in chlorophyll.

"A number of the plant's functions thus become impaired. Roots lose some of their ability to take up salt and water, photosynthesis is reduced, and the phloem tissue can no longer transport much food material through the plant. All these disruptions probably contribute to the plant's death.

What Causes Growth Changes?

"Even though we can observe the changes in growth that occur after 2,4-D is applied, we still don't know what 2,4-D is doing in the cell to cause these aberrations. For this reason we have examined the changes occurring in the cytoplasm, or living substance of the cell as it grows."

The Illinois scientists made electromicrographs of the cytoplasm of meristematic cells and elongating cells, which enabled the investigators to detect the presence of membranes which connect various portions of the cell and also bound it. The membranes contain the enzymatic system for salt accumulation and may be the centers for other enzymatic reactions.

"As cells elongate, the cytoplasm changes markedly," the authors continue. "The granules disappear, apparently metabolized in the process of protein and lipid synthesis. Membranes thicken and become much more prominent. Mitochondria develop internal membranes and reach peak efficiency. Cytoplasm of this type is mature and fully functional.

"Now what does a herbicidal concentration of 2,4-D do to cell growth? Although our experiments are not complete, the results thus far strongly suggest that 2,4-D prevents the immature cytoplasm from changing into mature, functional cytoplasm. In addition, the mature cytoplasm seems to revert, at least in part, to the immature stage. As the cytoplasm reverts, the number of granules, or ribosomes, increases greatly. This is evidenced by an increase in ribonucleic acid. Shortly afterwards, the cells start to divide.

"Since so much ribonucleic acid is produced, 2-4-D must evidently work through some phase of nucleic acid metabolism. It may be that 2,4-D has two effects:

"It induces the nucleus to form more ribosomes and it also blocks the normal expansive-growth metabolism of the ribosomes.

"Oddly enough, very low concentrations of 2,4-D promote growth and make the ribosomes disappear faster."

Professors Slife and Hanson expressed the hope that the experiments they and others are conducting with 2,4-D will eventually lead to better weed control with herbicides. "Furthermore," they say, "it is likely that as a byproduct of the research, we will gain knowledge about the fundamentals of growth that can be applied to a more abundant crop production."

SPRAYING SYSTEMS
SPRAY NOZZLES
and related equipment
for better lower cost farm spraying
TeeJet®
SPRAY NOZZLES
For uniform spray distribution and exact volume control.
Boomjet®
SPRAY NOZZLES
For spraying grains and grasses...and liquid fertilizers.
ACCESSORIES FOR BOOM AND HAND SPRAYERS
Split-Eyelet Connectors
Diaphragm Pressure Relief Valves
DirectoValve
Most components in choice of brass, aluminum, Nylon and stainless steel for all spraying needs.
GunJet Spray Guns
For complete information write for Catalog 38
SPRAYING SYSTEMS CO.
3214 Randolph, Bellwood, Ill.

MANAGEMENT VOLUME—A new reference book, "Managing for Profit," written in the interest of fertilizer manufacturers, has been published by International Minerals & Chemical Corp. A copy of the 445-page book, containing sections on both the theory and actual practice of sound management, is presented in the picture above to M. C. Morton, left, by A. E. Cascino, vice president of marketing for IMC. The book was given to all executives attending a recent three-day fertilizer management seminar at IMC's headquarters at Skokie, Ill.

Reference Book Summarizing Fertilizer Management Seminar Is Published by IMC

SOME 70 executives of fertilizer manufacturing companies attended a three-day fertilizer management seminar sponsored by International Minerals & Chemical Corp. in Skokie, Ill., last month. All phases of fertilizer company management were covered in the sessions which were summarized in a reference book which at the termination of the seminar, was presented to those in attendance.

The book, containing theoretical aspects of management as well as actual practice, comprises 445 pages. The theoretical section reprints the company's "Full Orbit" manual collection, and brings them to life through a hypothetical company which seeks solutions to problems familiar to those faced by all fertilizer company operators.

Two hundred pages of the book are devoted to helping the management of this imaginary plant solve its current problems and to suggesting methods of increasing its profits.

The idea was developed to simulate operations of a typical fertilizer producer's plant, with a full-time employment of 12 and an additional 20 part-time employees added during the spring rush season. Following are some of the situations covered:

The company's competition is increasing from the five other producers already located in its sales area.

There is a constant flux in demand for many mixed grades of fertilizer. An immediate problem is the firm's conveyor system, which is overdue for replacement.

New selling techniques must be given to its sales force to meet the competition's efforts and to increase over-all sales volume. Community relations have suffered because of the fumes produced by the plant.

Accurate budgeting has become increasingly important to the company and it needs more ready cash. The latter is particularly important in the firm's financial program in order to take advantage of seasonal discounts available on raw materials.

The IMC answer to these and other problems is contained in the book. Each chapter deals with a specific area of plant management. The sections were prepared by IMC executives who presented them at the seminar.

The book provides a verbatim record of the presentations given at the seminar. Some of its chapters deal with administration and management; financial management; profit planning; accounting; credit and collections; insurance; purchasing; personnel development; production; public and community relations; future trends; transportation; modern marketing; market analysis; advertising and promotion, and sales management.

Lebanon Gives Up Plan To Build Ammonia Facilities

Plans for the first ammonia plant for the country of Lebanon have been postponed because of current overproduction of nitrogen in Italy and West Germany, according to reports received in the U. S. The overproduction in Europe resulted in a price cut of 24%, which was considered the final blow to halt the plan for additional production facilities in Lebanon.

However, Russian and Czech funds are reported earmarked for building ammonia fertilizer industries in Syria and Iraq for consumption in those countries and also for export.

Lebanon's domestic consumption of ammonium fertilizers is less than 30,000 tons a year.

FINES
Through the Screen

Agriculturists in Peru are worried at the present time about the possibility of a warm ocean current which, once every seven years or so, flows northward along the coast to replace the normal "Peru Current." The latter is a cold stream which supports sea plants and small life which in turn provides food for guano birds. When the warm current hits, great havoc results. The normal chilly water is replaced and marine life perishes. Sea birds die by the millions, and torrential rains batter north and central Peru.

But of prime interest to Peruvian agriculture, is the possibility of losing the guano birds, producers of nitrogen-containing fertilizer described as being "invaluable" to the Peruvian economy.

Dr. H. P. Berlage of the Royal Netherlands Meteorological Institute has predicted the arrival of the warm current this year, based on his studies of oceanic and atmospheric circulations in the Pacific. Oddly enough, the warm current is called "El Nino" which means "The Child." The seemingly incongruous name for such a scourge was gained because the warm current often appears around Christmas time.

Regardless of its name, however, the current upsets drastically the balance of nature on Peru's coast.

●

The charge for testing New Hampshire soil samples was to be increased from 50¢ to $1, beginning July 1, it was announced by Gordon P. Percival, head of the testing laboratory of the Department of Biochemistry at the University of New Hampshire at Durham. He said the additional charge was made necessary by the increased cost of service.

Recommendations for soil treatment are made by county agents on the basis of the tests.

●

A group of "manure manipulators" in Colorado is objecting to paying the state's 25¢-a-ton inspection fee, maintaining that they should not be classified as "commercial fertilizer" operators. They are asking an injunction to restrain the state Agriculture Department from any further attempts to collect fees from manure manipulators.

Under Colorado law, a "manure manipulator" is one who mixes cow, sheep, chicken and other manures with peat and sells the resulting mixture. A spokesman for the objecting group says that the law should not include manipulated manures under commercial fertilizers subject to the tonnage tax. He says that the manure dealers pay a $5 license fee each year. which should be all they are required to pay.

●

Chinese Communists are utilizing planes of their air force to battle heavy infestations of locusts reported swarming on drouth-stricken provinces in the interior of north China.

The official People's Daily reports six government planes have been assigned to antilocust duty in northern Anhwei Province. The planes, it said, have flown hundreds of missions over the area, spraying insecticide, since the first week of June.

"Because of the drouth conditions since spring, locusts multiplied earlier and quicker this year," it said.

●

The 46th national meeting of the American Institute of Chemical Engineers will be held in the Lake Placid Club, Lake Placid, N.Y., Sept. 24-27. "Management" will be the theme of the meeting. Some 2,000 chemical engineers from all parts of this country and Canada are expected to attend.

●

Escaping ammonia from a barge of Mid-South Chemical Co. routed residents of a number of communities in central Illinois Aug. 1, but no injuries were reported. A faulty hose connection was reported to be the cause of the leak which sent the gas rolling across the countryside.

Firemen called to the scene in an attempt to cope with the situation were unable to stop the flow immediately, and many were later admitted to hospitals. In all, some 62 persons were reported to have been treated by doctors, but none of the incidents proved serious.

The communities of Creve Coeur, Bartonville, North Pekin and Marquette Heights were involved in the situation, with some 12,000 persons evacuating their homes temporarily at the request of city officials.

Correction

An item in Croplife's June issue indicated that Schweiger's, Inc. had been made a distributor for Highway Equipment Co. to handle the latter's line of spreaders, blenders and bulk material haulers. Location of Schweiger's was erroneously given as Waterloo, Iowa. The correct location should have been Watertown, South Dakota, from which the distributor will serve the entire state of South Dakota and parts of Minnesota. We regret this error and apologize to the parties affected.

Bemis Secretary Retires

Ronald Ramsay, secretary of the Bemis Bro. Bag Co., St. Louis, retired July 31, after a 35-year career with the company, principally as one of its top administrative and fiscal authorities.

Southeast Safety Meeting Program in Readiness

All is in readiness for the Southeastern regional school on accident prevention in fertilizer plants, scheduled for Aug. 24-25 at the Cape Fear Hotel, Wilmington, N.C.

Chairman of the meeting is W. C. "Billy" Creel, safety director of the state of North Carolina. Instructors will include qualified national safety leaders in the fertilizer and chemical industries.

An added feature to the program will be a new unit on fire extinguishers and fire fighting. Another unit will deal with hazardous liquids. In addition to the speaking portions of the program, three of the best safety movies available will be shown.

Fertilizer firms in the southeastern portion of the U.S. will have representatives at the meeting. Last year's meeting in Wilmington attracted an unusually large attendance.

THEIR BUSINESS IS MAKING YOUR BUSINESS BETTER

They're four of several hundred Cyanamid people who mine, process, research, deliver and service phosphatic materials for your acidulation and mixed fertilizer business. These people put Cyanamid's more than 40 years of phosphate experience into products and services you can use.

Services you can use

Traffic Service: Cyanamid traffic specialists are ready to route and ship your orders without delays. Their knowledge can save you money, and can make your operation run even more efficiently.

Technical Service: Cyanamid's staff of technical experts are constantly at your service. Make your formulation and production problems theirs. That's their job.

Sales Service: Cyanamid sales representatives are available to work with and for you in expanding present markets or in establishing new markets.

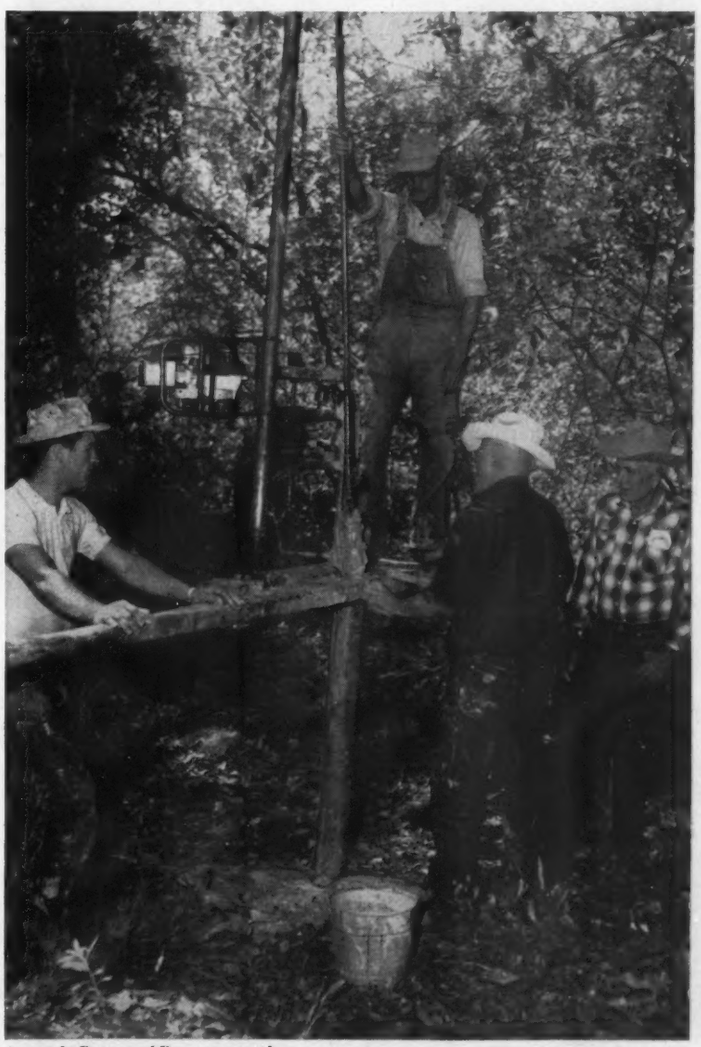
Products you can use

Cyanamid's phosphate business is the mining and manufacturing of the highest quality products for your mixed fertilizer requirements.

- Florida Natural Phosphate Rock.
- TREBO-PHOS® – Triple Superphosphate.
- Phosphoric acid – an economical source of P_2O_5 for high analysis fertilizers.

American Cyanamid Company, Agricultural Div., N. Y. 20, N. Y.

®TREBO-PHOS is American Cyanamid Company's trademark for its triple superphosphate.



One of Cyanamid's prospecting crews checks a sample just taken from the well. Their work in locating and verifying phosphate deposits is essential in maintaining adequate reserves of mineable, high-grade phosphate rock for your requirements in future years.

CYANAMID

PHOSPHATE PRODUCTS

CYANAMID SERVES THE MAN WHO MAKES A BUSINESS OF AGRICULTURE

Southwest Fertilizer Conference Speaker Pleads for More Imagination in Selling

THAT the fertilizer industry has done a tremendous job for agriculture in general and for the farmer in particular, was emphasized by speakers at the Southwestern Fertilizer Conference and Grade hearing at Galveston, Texas, July 19-22. Working around the theme "Fertilizer Needs and Consumption in the Southwest," the program comprised panel discussions and talks covering both the technical and marketing aspects of the fertilizer business.

W. E. Wierenga, vice president of the Ortho Division of California Chemical Co., Richmond, Cal. was high in his praise of the way fertilizer itself has proved its worth over and over, but added that the industry can hardly be proud of the "weak, timid job it has done in merchandising these products."

He pointed out that much more imagination is needed in selling plant food products . . . that farmers are interested in the results they receive from fertilizer application, rather than in buying merely so many pounds of fertilizer. "Yet, the fertilizer industry has consistently based its appeal on price per pound or per ton of plant food," he said. This has led growers to the practice of continuous shopping for better deals, and the fertilizer industry has been willing to condone and in some cases, to actually encourage it.

"The lack of imagination by industry and the willingness to meet any price quotation has, no doubt, often contributed to an erroneous belief among farmers, that the profits in fertilizer must be large."

The California executive asked, "Why doesn't the fertilizer industry employ some sales imagination?" He then suggested that part of the reason may lie in there being not enough marketing specialists in charge of sales policies throughout the trade.

"Too many of the members of our industry leave the selling of their products to a third party—such as experiment stations, universities, colleges and trade associations. The third party many times is primarily interested in saving farmers money, rather than making money. As a result, it recommends that farmers buy as cheaply as possible, and this further degrades merchandising techniques.

"The grower's opportunity to make money, by being certain he buys the right fertilizer, uses it in the proper amount, applies it correctly, and at the right time, is far greater than any possible saving he may derive from 'chiseling a few dollars on the price.' It should take very little imagination or time to understand that. There is far more romance in making money than in saving it."

Mr. Wierenga then pointed out signs of encouragement showing on the horizon . . . a few companies which are emphasizing results for growers; showing them how to make money, not merely to save it. He said that some companies are training sales forces to use imagination and sell results, rather than merely products and price. He expressed the hope that this trend will continue.

The conference planning committee was headed by Dr. and Mrs. N. D. Morgan, American Potash Institute.

AT GALVESTON MEETING—Participants in panel discussion at Southwestern Fertilizer Conference in July included, left to right, top photo, John E. Hutchinson, director of agricultural extension of Texas, moderator; Dr. W. F. Bennett, extension soil specialist in charge of soil testing in Texas; Dr. Gayland Hanes, Oklahoma State University; and Woody Miley, Arkansas extension service. Panel discussed "Where Are We and Where Should We Be?" Additional speakers on the program are seen in lower photo. They are, left to right: Dr. Sam Tisdale, The Sulphur Institute; M. E. Wierenga, vice president, Ortho division, California Chemical Co., Richmond, Cal.; Murray Renick, Rollo Feed Mills, Rollo, Mo.; and John Cox, agricultural extension service, Louisiana.

Minor Elements Topic At Officials' Meeting

A panel discussion on trace elements will be a feature of the 15th annual meeting of the Assn. of American Fertilizer Control Officials when the group meets at the Woodner Hotel, Washington, D.C., Oct. 25-26.

According to an advance program issued by Dr. Bruce D. Cloeninger, Clemson, S.C., secretary-treasurer of the AAFCO, speakers on the panel will include two industry representatives, one from USDA and an extension specialist.

Gordon Cunningham, Tennessee Corp., Atlanta, Ga., will discuss sale and distribution of fertilizers containing minor or trace elements, and Dr. S. F. Thornton, F. S. Royster Guano Co., Norfolk, Va., mixed fertilizer production. Dr. Frank G. Viets, Jr., soil scientist, USDA, Ft. Collins, Colo., will talk on agronomic needs and Dr. Robert E. Lucas, extension specialist in soil science, Michigan State University, East Lansing, Mich., will discuss diagnosis and recommendations.

Dr. F. W. Quackenbush, Lafayette, Ind., will be moderator of the panel.

Other features of the program will include an address by C. V. Marshall, Ottawa, Ont., Canada, president of the Assn., and an address by Dr. R. C. Edwards, president, Clemson Agricultural College, Clemson, S.C.

Dr. Willard H. Garman, chief agriculturist, National Plant Food Institute, Washington, D.C., will talk on "Fertilizers and Our Changing Agriculture."

Robert Z. Rollins, chief, division of chemistry, California State Department of Agriculture, Sacramento, will report on new legislation, and state investigators will make their annual reports to complete the meeting agenda.

Pacific N.W. Group Plans Applicators' Conference

The third annual agricultural chemical applicators' conference for the Pacific Northwest is planned for Oct. 9-10 at the Chinook Hotel in Yakima, Wash.

The conference is expected to attract applicators from Montana, Idaho, Oregon and Washington as well as from Canada and California.

Theme for the 2-day meeting will be "New Agricultural Chemicals." This will include discussions of new registrations and new tolerances for established products, also, latest information on products and crops to which they may be applied.

The first day of the meeting will include a presentation of papers by speakers from chemical firms and also those from various research organizations. The second day will feature a display of equipment, both for ground and aerial application, at the Yakima Municipal Airport.

New Plant for Bemis Being Built in Texas

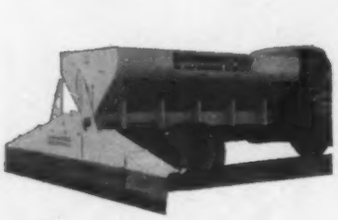
Construction of the new 200,000 square foot Bemis Bro. Bag Co. plant at Houston, Tex., for the manufacture of paper, textile, and open mesh bags began August 1, the company announced.

Judson Bemis, president, said the one-story facility will be built for Bemis by the Inwood Construction Co. of Dallas. It will cost approximately $1.4 million, not including machinery and other contents.

The plant is expected to be completed by next March and in full operation by mid-year 1962, Mr. Bemis said. It will occupy approximately 5 acres on an 18-acre site in northwest Houston.

BAUGHMAN

THE COMPLETE LINE OF FERTILIZER SPREADERS



The K-BODY for Dry Fertilizer

Spreads lime and fertilizer efficiently and uniformly, in exactly the amount you want. The most rugged spreader body ever built, with fewer working parts, insuring longer service life. Exclusive lubrication-impregnated chain helps retard corrosion and prevent freezing. Your choice of 4 drives, 3 body styles, single or double distributor. Write for Bulletin A-425.

The RAPID SPREAD for Liquid Fertilizer

A completely self-contained unit; can be mounted on flat bed truck or farm wagon in 10 minutes. Spreads liquid in droplets in 40 to 60-foot pattern. Operates on compressed air, which heats and agitates fertilizer to prevent sludging in cold weather. Standard model holds 1000 gallons; other sizes built to order. Write for Bulletin A-461.

The QUICK-SPREAD for Dry Fertilizer

A versatile unit which spreads in any kind of weather; on muddy fields, rough pasture, in orchards, under low-hanging trees, and other hard-to-reach places. Holds one ton 60-pound granular; spreads an acre in 2½ minutes; spreading width up to 32 feet. One-man operation from tractor, jeep or pick-up truck. Driven from PTO or auxiliary engine. Write for Bulletin A-458.

A few choice distributorships available

Better service through better engineering. Parts and service from 200 distributors.

BAUGHMAN MANUFACTURING COMPANY, INC.

310 SHIPMAN ROAD • JERSEYVILLE, ILLINOIS

6142

Croplife Want Ads... Get Results

1961 Texas Fertilizer Law Hits at Traditional Terms

SOME FEATURES of the new Texas Commercial Fertilizer Control Act of 1961 differ considerably from previous legislation on the state level. The new Texas law becomes effective on September 1 this year.

According to Dr. W. O. Trogdon, head of the department of agronomy, Texas A&M College, the new legislation contains some features likely to be used as models in future legislation in other states.

In a recent discussion on the need for clarity of fertilizer terminology, Dr. Trogdon commented on the new Texas law in a recent publication of the college. "Because of common usage and acceptance, two terms were kept in the new law which have been discussed pro and con for years by people engaged in fertilizer work," he said. "These terms are available phosphoric acid (P_2O_5) and soluble potash (K_2O) as used in grades of commercial fertilizers and in guaranteed analysis.

"Some confusion in understanding may result from the continued use of these terms since, effective January 1961, all papers to be published in the Soil Science Society of America Proceedings, Agronomy Journal, Crop Science and Crops and Soils will use the elemental (N-P-K) method for identifying and reporting fertilizer or other chemical nutrient analyses.

"In these publications, 10-20-10 fertilizer, as defined by the new Commercial Fertilizer Control Law, will be referred to as a 10-8.7-8.3 fertilizer. The reason for this apparent inconsistency is explained further along in this article.

"Both agriculture and the fertilizer industry have been plagued with a legacy of rule-of-thumb methodology and a tendency to place an exaggerated importance on the traditions of the past.

"Widespread change to the elemental expression for phosphorus and potassium would be slow in coming about without an intensive educational campaign among all segments of the fertilizer trade, from manufacturer to the user on or in the soil. For the time being, therefore, the Texas Agricultural Experiment Station and the Texas Agricultural Extension Service will adopt a middle-of-the-road policy in referring to phosphorus as P_2O_5 and to potassium as K_2O, since these terms are the same as the fertilizer grades involved in the new law. For example, if a soil test calls for 40-40-40, this would be met with an application of 400 pounds per acre of a 10-10-10 fertilizer.

"Because of the need to express the value of fertilizer materials and mixtures on the basis of their content of the primary fertilizer elements, or a simple compound of these elements, rather than on the weight of the source of the material as a whole, early fertilizer grades were expressed in terms of the percentage of ammonia (NH_3), available phosphoric acid (P_2O_5) and water soluble Potash (K_2O).

Nitrogen Guarantee Change

"The guarantee for nitrogen in fertilizers was changed a few years ago from ammonia to nitrogen, but the practice of expressing the value of phosphorus and potassium materials as the oxides has followed through from the early history of the industry. Agronomists and soil scientists have long been on record as supporting the elemental method of identifying fertilizer nutrient contents.

"To be absorbed by most plants, with the exception of legumes, nitrogen must be in a form other than elemental nitrogen. Nitrogen as a fertilizer ingredient usually is referred to as active or inactive, rather than as available or unavailable, unless the results of actual field or growing tests are referred to. Empirical laboratory methods have been developed which give results in reasonable agreement with field tests.

"In the fertilizer trade, the term phosphoric acid (as total, insoluble or available phosphoric acid) means the combination of phosphorus and oxygen expressed by the formula P_2O_5. This compound in reality is phosphorus pentoxide (phosphoric anhydride).

"The phosphorus in fertilizers generally is present in the form of the orthophosphate, a combination of 1 phosphorus and 4 oxygen with hydrogen and some metallic element, such as calcium or ammonium. Orthophosphoric acid, H_3PO_4, is the common form of phosphoric acid which is now marketed at 75% phosphoric acid with a fertilizer guarantee of 52 to 54% P_2O_5. The term 'phosphoric acid' designates P_2O_5, according to the official definition adopted by the Assn. of Official Agricultural Chemists (AOAC), which accounts for the fact that 75% ortho-phosphoric acid is only 52 to 54% P_2O_5.

"Potassium is absorbed as the potassium ion, $K+$, and may be supplied in a number of inorganic salts. Available potash is that which is soluble in water, or in a solution of ammonium oxalate.

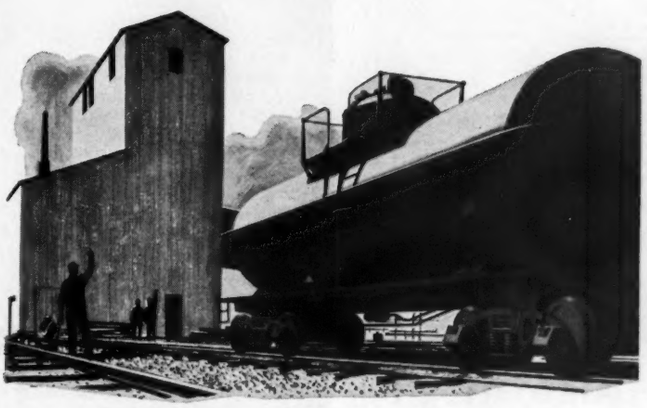
"It is apparent that a fertilizer grade or the guaranteed analysis of a fertilizer ingredient is intended to mean that the nitrogen, phosphorus, potassium or other plant nutrients are in a chemical form capable of being assimilated by the growing plants or easily capable of being converted into such a form in the soil during the growing season. It should make little difference as to how the plant nutrients are expressed so long

Turn to **TEXAS LAW** page 38

COMMON CONVERSION FACTORS

(A)	A to B	(B)	B to A
Nitrogen (N)	1.2159	Ammonia (NH_3)	0.8225
Nitrogen (N)	4.4261	Nitrate (NO_3)	0.2259
Nitrogen (N)	6.25	Protein	0.160
Phosphoric acid (P_2O_5)	0.4369	Phosphorus (P)	2.2886
Phosphorus (P)	3.0658	Phosphate (PO_4)	0.3262
Potassium (K)	1.2046	Potash (K_2O)	0.8302
Free lime (CaO)	0.7147	Calcium (Ca)	1.3992
Magnesia (MgO)	0.6032	Magnesium (Mg)	1.6666

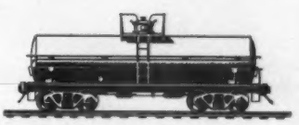
DEPEND
ON
PHILLIPS 66
FOR
Fast Deliveries



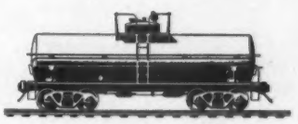
when you need fertilizer mixing materials

The industry's largest fleet for transporting liquid nitrogen . . . plus careful traffic control . . . assure you of materials when you need them. Call or write today; let us show you that we mean business in making on-time deliveries of high quality materials that mean more business and profits for you.

Use these high quality materials to produce premium fertilizers



NITROGEN SOLUTIONS



ANHYDROUS AMMONIA

AMMONIUM NITRATE

AMMONIUM SULFATE

TRIPLE SUPERPHOSPHATE

PHILLIPS 66

PHILLIPS PETROLEUM COMPANY • Sales Offices: Amarillo, Tex., First Nat'l Bank Bldg. • Atlanta, Ga., 1428 West Peachtree St., • Bartlesville, Okla., Adams Bldg. • Chicago, Ill., 7 South Dearborn St. • Columbus, Ohio, 395 E. Broad St. • Denver, Colo., 1375 Kearney St. • Des Moines, Iowa, 6th floor, Hubbell Bldg. • Houston, Tex., 6910 Fannin St. • Indianapolis, Ind., 3839 Meadows Drive • Kansas City, Mo., 201 E. Armour Blvd. • Maplewood, N.J., 2075 Millburn Ave. • Minneapolis, Minn., 215 South 11th St. • Omaha, Neb., 3212 Dodge Street • Pasadena, Calif., 317 North Lake Ave. • Raleigh, N.C., 401 Oberlin Road • Salt Lake City, Utah, 68 South Main • Spokane, Wash., 521 East Sprague • St. Louis, Mo., 4251 Lindell Blvd. • Tampa, Fla., 3737 Neptune St. • Tulsa, Okla., 1708 Utica Square • Wichita, Kan., 501 KFH Building

State Fertilizer Consumption for Indicated Periods of 1961°, in Tons

	January	February	March	First Quarter Total	April	May	June	Second Quarter Total
Alabama	15,481	.....	194,667	.....	.....	.....	.....	.....
Arizona	.....	.....	.....	48,742	.....	.....	.....	.....
Arkansas	9,882	23,548	60,709	94,139	105,999	60,625	51,256	217,880
California	.....	.....	.....	75,033	.....	.....	.....	.....
Florida	197,675	243,317	248,260	689,252	193,154	235,648	193,457	622,259
Georgia	.....	.....	.....	222,787	.....	.....	.....	.....
Kentucky	72,214	44,862	53,379	170,455	76,818	.....	.....	.....
Louisiana	11,295	17,421	44,538	73,164	73,812	43,670	23,694	141,176
Mississippi	17,825	46,462	110,348	177,188	193,506	115,112	64,760	373,378
Missouri	40,032	42,887	67,010	149,929	129,750	181,433	.....	.....
New Mexico	.....	.....	.....	23,207	.....	.....	.....	.....
N. Carolina	70,678	105,370	324,097	500,145	463,919	294,785	112,231	870,935
Oklahoma	5,108	9,875	21,450	36,433	18,661	20,310	12,440	51,411
Oregon	.....	.....	.....	58,303	.....	.....	.....	.....
S. Carolina	39,504	73,099	284,236	387,839	123,024	125,695	56,607	305,326
S. Dakota	21,338	.....	.....	.....	.....	.....	.....	.....
Texas	27,351	53,844	141,604	222,799	68,794	99,438	79,550	247,782
Virginia	.....	.....	.....	258,171	.....	.....	.....	.....

°As reported officially by each state.

Ammonia Institute Plans January Convention Agenda

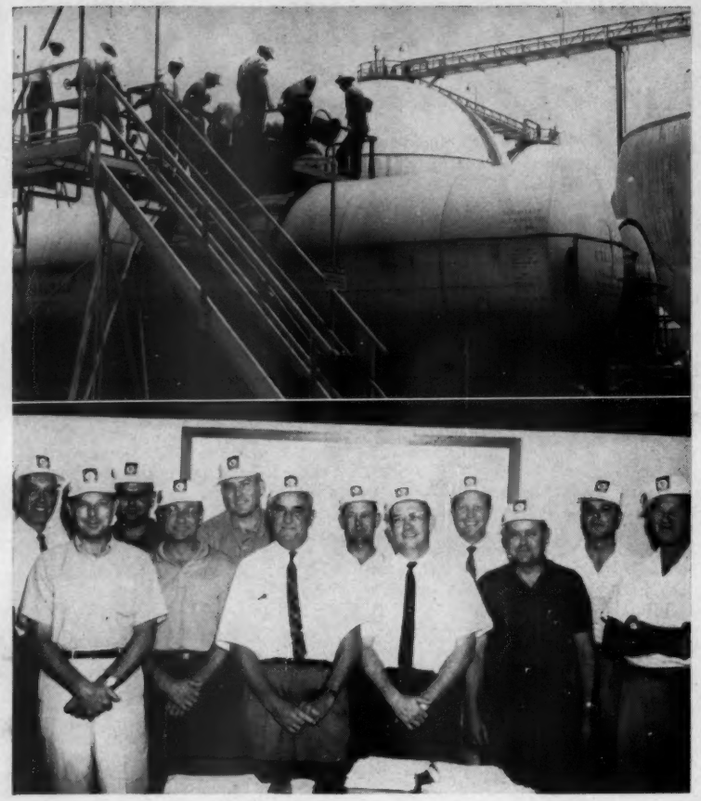
St. Louis, Mo. has been chosen by the Agricultural Ammonia Institute as the meeting place for the group's 11th annual convention, Jan. 10-12, 1962. Headquarters for the convention will be the Sheraton-Jefferson Hotel.

According to an announcement by Jack Criswell, Memphis, Tenn., executive secretary of A.A.I., the program will include talks by Dr. George Smith, chairman of the Department of Soils, University of Missouri; Roswell Garst, hybrid corn producer and cattle man, Coon Rapids, Iowa; Dr. G. Herbert True, marketing expert, South Bend, Ind.; and Dr. B. G. Gross, executive secretary, North Town Industrial Management Club, Chicago.

In addition to Mr. Criswell, chairman, are the following members of the convention committee: Jack Howard, Squibb-Taylor, Inc., Memphis, Tenn.; Mike Spatz, Spatz Industries, St. Louis; Al Rider, Bastian-Blessing, Inc., St. Louis; and Harvey Koehler, Phillips Petroleum Co., St. Louis.

Spencer Subsidiary

Spencer Chemical Co., Kansas City, Mo., was expected to acquire all the assets of Perkins Glue Co., following a plan of reorganization recently drawn up between the two companies. According to Jack C. Denton, Spencer president, the Perkins firm will be operated as a wholly-owned subsidiary. Perkin's headquarters is at Lansdale, Pa., near Philadelphia.



INSPECTION TRIP—Sales personnel of Escambia Chemical Corp. met in Pensacola, Fla., recently for a four-day meeting. Part of the group is seen in above photo inspecting low-pressure tank car for shipping ammoniating solutions. It is one of 97 cars in Escambia's fleet. In the lower photo are those in attendance at the meeting. Left to right: R. U. Haslanger, president; Robert M. Harding, sales representative; James M. Sullivan, sales representative; James H. Paul, product manager; Frank Salter, sales representative; Fred C. Broadway, division sales manager; Roland C. Rayburn, product manager; Rudolph J. Childre, sales representative; James A. Hunter, sales manager for nitrogen products; James A. Bentley, sales correspondent; John B. Clopton, vice president and director of sales; and Ralph F. Allen, sales representative.

Escambia Outlines Expanded Sales Efforts

Escambia Chemical Corp. held a four-day sales meeting at its Pensacola plant July 10 through July 13, when plans were revealed for marketing the firm's nitrogen products through its own sales force.

R. U. Haslanger, president, keynoted the meeting by tracing the rapid development of Escambia since it began operation in 1955 and announcing the corporation's most successful year in 1960. He said the firm is presently spending about 5% of its net sales dollar on research for improvement of present products and the development of new ones.

John B. Clopton, vice president and director of sales, announced to the group plans for expanding the area now served by Escambia. The new territory will include Mississippi, Arkansas, Louisiana, Texas, Missouri, Tennessee, Kentucky, and the Carolinas.

James A. Hunter, nitrogen sales manager, told of the corporation's marketing plans and introduced six new members of the sales staff. (Details in "Men Moving Ahead" column, page 7 this issue.)

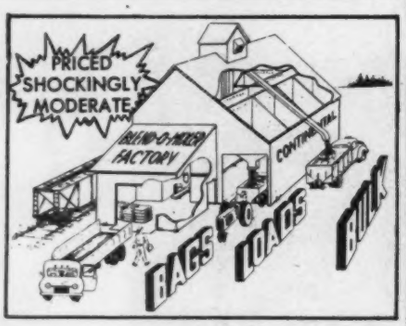
He also announced that additional sales representatives are being added to cover other areas as rapidly as qualified personnel can be obtained.

Roland C. Rayburn, product manager for direct application solutions and ammonia, told of the company's plans for increasing the number of distributor stations throughout the territory.

A. E. New, vice president in charge of production, and eight Pensacola department heads presented comprehensive accounts of the company's operations at the multi-million dollar Pensacola plant.

Escambia Chemical Corp. announced on July 1 that it would handle the sale of all nitrogen products by its own sales force, effective that date. The meeting was held to acquaint the new sales staff with the company facilities, products, and plans.

WHY NOT PROFIT
TEN $ A TON
OR BETTER
ASK FOR PROOF!
JOIN THE NATION'S
TREND TO BLEND
WHERE YOU LIVE...
OWN YOUR OWN
FERTILIZER PHARMACY!
EXTENDED PAYMENTS, IF YOU WISH.
ADD TO YOUR EXISTING PLANT



This PUSH BUTTON BLEND-O-MIXER

SOLVES PROBLEMS . . . such as — slow Step-By-Step mixing, shrinkage, inaccuracy, labor, high maintenance and inadequate storage losses, inefficiencies and high investment!

ELECTRIC TIMER AUTOMATICALLY STOPS the BLEND-O-MIXER ON YOUR SPECIFIED TONNAGE!
This Commercial Fertilizer DRUG STORE IS AT YOUR FINGER TIPS
Buy all or any part of it! Or—Rent the Blend-O-Mixer!

FREE BROCHURE
Please send me brochure and more information about the Blend-O-Mixer:
My present annual tonnage is _____
NAME _____
ADDRESS _____
CITY _____ ZONE ____ STATE _____

MANUFACTURED, SOLD AND INSTALLED BY
CONTINENTAL SALES CO.
Box 212 • NEVADA, IOWA • Phone EVergreen 2-2145

Industry Statistics for California Announced

SAN FRANCISCO — The agricultural chemicals industry gained in second quarter employment between 1959 and 1960, reports the division of research and statistics of the California State Department of Employment.

The average number of persons employed during each of the spring months rose from 3,330 to 3,550 in the agricultural chemicals industry. The number of agricultural chemicals reporting units dropped from 112 to 107, despite the employment rise.

Total quarterly wages for agricultural chemicals increased from $4,638,007 to $5,094,418.

Canadian Safety Workshop Planned

More than 100 industrial safety experts from the U.S. and Canada are expected to attend a chemical industry safety workshop in Niagara Falls, Canada, Sept. 27. Sponsored by the general safety committee of the Manufacturing Chemists' Assn., the workshop will hear discussions on solutions of common safety problems in plants.

J. S. Queener, manager, employee relations department of E. I. du Pont de Nemours & Co., Inc., chairman of the MCA committee, will be the workshop moderator.

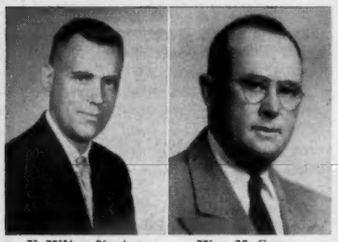
MEN MOVING AHEAD

Continued from page 5

states, with headquarters in Louisiana, Mo. Mr. Pierce will be responsible for the sale of Hercules pesticides and plant foods product lines, including Toxaphene, and Nitroform. Mr. Pierce joined Hercules in 1951.

Hercules has also announced the appointment of **Kenneth T. Givens** as assistant sales manager of pesticides, in its agricultural chemicals division. He was formerly senior technical sales-service representative for the division in Texas. He joined Hercules in 1952.

●



F. Hilton Norton Wm. M. Gay

F. Hilton Norton has been named as Omaha district manager for Richardson Scale Co. Mr. Norton succeeds **William M. Gay** who has retired from service with the firm because of ill health. Mr. Gay was with Richardson since 1947. Mr. Norton has handled service assignments for Richardson since 1958 and previously operated his own business in Omaha.

●

James H. Eakin, Jr., extension agronomist at the Pennsylvania State University, has been named chairman of agronomy extension as successor to **Frank G. Bamer** who retired June 30.

Mr. Eakin's promotion was announced by **Dr. H. R. Albrecht,** extension director.

●

Ketona Chemical Corp., Ketona, Ala., has announced the appointment of **H. J. Weiland** as manager of research and development. He was formerly works manager. The announcement, made by **P. H. Neal,** president of Ketona, said Mr. Weiland will be responsible for development of new products and processes as well as the increase in production capacity of present products, including anhydrous ammonia and related materials.

H. J. Weiland

Mr. Weiland was formerly employed by Alabama By-Products Corp., co-owner of Ketona with Hercules Powder Co. He is a graduate of the University of North Carolina.

●

Escambia Chemical Corp., Pensacola, Fla., has announced the addition of new members to its sales staff. According to **James A. Hunter,** nitrogen sales manager, the following additions have been made:

Fred C. Broadway, formerly a division sales manager for International Minerals & Chemical Corp., was made division sales manager for Escambia with headquarters in Montgomery, Ala.

Ralph F. Allen, formerly with American Cynamid Co., was announced as sales representative for Florida.

Rudolph J. Childre, previously with Swift & Co., was made sales representative in southwest Georgia and North Florida. He will be headquartered in Albany, Ga.

Robert M. Harding, formerly with The Goyer Co. and for 10 years president of The Valley Fertilizer Co., Greenville, Mississippi, was announced as sales representative for Mississippi, Arkansas, Louisiana, and west Tennessee.

James M. Sullivan, previously with the Chilean Nitrate Sales Corp. and the Harley Bag Co., was named sales representative for south Alabama and west Florida.

Frank Salter, formerly with Ashcraft-Wilkinson Co., was named sales representative for south Alabama and south Mississippi.

James A. Bentley, Jr., who joined Escambia after a number of years in sales and traffic work, was made sales correspondent, with Atlanta as his headquarters.

●

Harry L. Carroll has been appointed district sales manager for American Potash & Chemical Corp., it was announced by **W. W. Young,** southern regional sales manager.

Mr. Carroll assumed responsibility for marketing industrial chemicals in the southeastern area, as of July 1. He will continue to make his headquarters in the company's Atlanta regional sales office.

C. L. Straughan continues as district manager in charge of potash and agricultural chemical sales.

●

Bryan W. Guess has been named head of sales for the new potash division of Texas Gulf Sulphur Co., according to an announcement by **A. Nelson Myers,** vice president and manager of sales. The new division will mine the large potash deposit in southeast Utah.

Mr. Guess will have responsibility for all potash sales and will commence at once to staff and organize a marketing department in the new division. He will make his headquarters in New York.

Kenneth E. Quick has been appointed sales representative for The Day Sales Co., Minneapolis, Minn. The announcement was made by **R. E. Gorgen,** president.

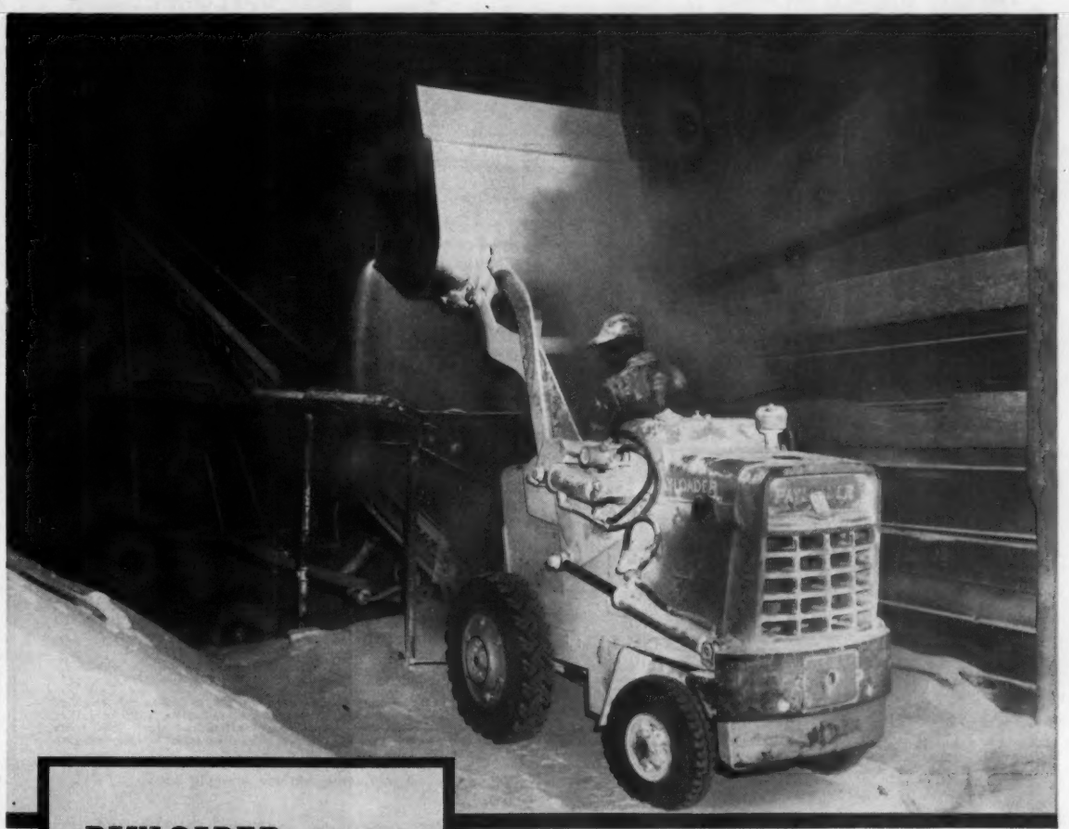
Kenneth E. Quick

Mr. Quick will represent Day in metropolitan San Francisco and the Northern California area. The Day Sales Co. distributes dust control systems and equipment.

●

The appointment of **Schaeffer E. Specht** as general sales manager for the Buell Engineering Co. New York, was recently announced by **J. L. Schumann,** president. Mr. Specht will supervise all sales operations for

Turn to MOVING AHEAD page 41



PAYLOADER users say:—

"The maintenance on our two Model H-25's has been lower than on any loader previously used."

"Our H-25 has proved to be a real workhorse—ruggedly constructed for continuous, dependable production."

"The H-25 has now worked 2 years with no lost production time. We find PAYLOADER equipment fast and efficient with low operational maintenance cost."

"H-25 gives maximum production output under ideal or adverse conditions."

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Illinois

Want low maintenance?

All PAYLOADER tractor-shovels are not exposed to dusty, dirty conditions, but many *are*. This is why Hough engineers take extra effort to design maximum production protection into all PAYLOADER models.

For example, this Model H-25 has dual-filtering of engine intake, individual cartridge-type filters on all three oil systems — for the engine, the hydraulics, and the torque-converter/power-shift transmission. Service brakes, hydraulic system, generator, distributor and ignition and starter switches are all sealed. In addition, more than 100 "O" rings and other seals are used on the hydraulic and mechanical systems to keep oil and grease *in* and dirt *out*.

Whatever size of PAYLOADER tractor-shovel you need, you can be sure it is designed with this same attention to production insurance. Your Hough Distributor will gladly show you how these high-production and low-maintenance features can "ease the profit squeeze" of your bulk handling.

THE FRANK G. HOUGH CO., 970 Sunnyside Ave., Libertyville, Ill.

Send "Industrial Materials Handling from A to Z"

Name
Title
Company
Street
City State

7-A-1

Grain Program for 1961 Seen As Fertilizer Demonstration

(Continued from page 2)

economy, it is said. It is increasing output of crops at a relatively small additional cost and perhaps in the long run it may be found best to rid farmers of all acreage control and federal bounties to retire land. The fertilizer industry could then expand its educational program showing growers how to reduce unit costs of raising crops, and thus make more profit by using fewer acres and getting maximum yield from the land thus employed. Taxpayers might then be relieved somewhat from the burdensome load which otherwise is likely to increase as it becomes necessary to buy more productive acreage to curtail ever-expanding surpluses.

This major problem is just below the fertilizer industry horizon at this time, but there is a broad undercurrent of optimism. Expansion plans for new facilities are exhibited broadly in the industry.

Information has built up news of a potential increase in nitrogen output for the next 18 months of an additional 1.2 million tons, all of which means cash disbursement out of new or existing plant facilities.

That certainly does not sound like a discouraged or disheartened industry. Perhaps the trade in some sectors has concluded that the feed grain program may turn out to be the most effective demonstration plot ever conceived and ultimately it may thank Willard Cochrane, economic advisor to Secretary Freeman.

The effect on the pesticide industry could also be one of benefit, although smaller acreages would appear to call for lesser amounts of crop protectants.

However, it is true that it will be more necessary than ever before to prevent insects from damaging crops growing on reduced acreages. Unit costs can soar if yields are cut to any great extent through the depredations of insects, weeds, or plant diseases.

On the debit side, however, is the apparently increasing scrutiny of the Food and Drug Administration on the pesticide industry. Top officials of FDA tell Croplife that for the present, it will police use of pesticides through spot checks on farms, and if flagrant violations or misuse of pesticidal products are evident, it may become necessary to adopt more rigid controls on the farmer.

PESTICIDE SITUATION

Continued from page 7

Minnesota Division of Plant Industry.

Exports of herbicides from the U.S. in 1960 were valued at $9,662,000, compared to $6,715,000 in 1959. During the first three months of 1961, herbicide exports had a value of $3,835,000.

Dust Carriers, Diluents

Sales of talc, pyrophyllite, and various clays for the formulation of pesticides were 24% greater in 1959 than in the previous year. Sales of talc and soapstone in 1960 for this purpose amounted to 95,108,000 lb. and of pyrophyllite 67,662,000 lb.

In presenting the general situation and outlook for pesticides for the 1961 season, Dr. Shepard and staff noted that low temperatures for long periods during the spring of 1961 slowed the sale and use of insecticides. He predicted that the situation would be reversed if the subsequent summer months should be hot and moist. (They were, in many parts of the country, but drouth has been a factor in some states.)

The use of herbicides, increased last year, was expected to continue its climb to new volume records in 1961. This rise was attributed to product improvement and rising cost of manual weed control.

"The volume of pesticide usage is determined largely by weather conditions during the crop season," the report observes. It continues: "Wet weather was general in 1960, favoring the growth of weeds and the development of fungus diseases. As a consequence, the use of fungicides and herbicides rose over 1959, while insecticide sales were somewhat lower.

"The National Agricultural Chemicals Assn. reported sales of pesticidal chemicals at the basic manufacturers' level to be up 3% over 1959, to reach a total of $285 million."

TEXAS LAW

Continued from page 35

as the terminology is understood. With the present terminology, none of the plant nutrients (N-P-K) is absorbed in the form in which it is guaranteed ($N-N_2O_5-K_2O$).

Standard Policy Adopted

"To promote a better understanding of fertilizer terminology and to do a better job of education in the field, a standard policy for fertilizer terminology in publications issued by the Texas Agricultural Extension Service and the Texas Agricultural Experiment Station is being adopted:

1. When referring to fertilizer or chemical nutrients, use the elemental means of expression, i.e., nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, etc.

2. Plant analyses are to be reported on the elemental basis when referring to a chemical element.

3. When referring to fertilizer rates or rates of nutrients, use the terminology:

Nitrogen
Phosphorus (P_2O_5)
Potassium (K_2O)

4. In tables listing soil analyses or fertilizer rates, use the headings: N, P_2O_5 and K_2O, or nitrogen (N), phosphorus (P_2O_5) and potassium (K_2O).

5. In instances where greater clarity is needed, descriptive adjectives can be used with the foregoing terminology, i.e. total phosphorus (P_2O_5), available phosphorus (P_2O_5), etc. If parentheses are not used to enclose the chemical symbol then the word "as" should be used, i.e. phosphorus as P_2O_5 and potassium as K_2O, or sodium bicarbonate extractable phosphorus as P_2O_5, etc.

6. To speed up the educational acceptance of the elemental expression of phosphorus and potassium, their equivalents can be used in conjunction with the terminology in items 3 and 4 if the writer so desires. For example, 40 lb. phosphorus as P_2O_5 is equivalent to 17.5 lb. phosphorus (P), or 40 lb. potassium as K_2O is equivalent to 33 lb. potassium (K).

"To assist in converting from one means of expression to another, the accompanying conversion factors may be of help. To find the equivalent of one element A in terms of another B, multiply the amount A by the factor in column A to B. To calculate a reversed amount, multiply the amount B by the factor in column B to A."

Books on Soils and Soil Management

SOILS AND FERTILIZERS—Fourth Edition

Firman E. Bear

Covers in detail: soil chemicals, important soil elements such as nitrogen, phosphorus, calcium; yield prospects of crop plants, moisture control, soil management; mechanical operations; soil conservation; organic matter maintenance. New facts, accurate figures. 66 illustrations, 420 pages $6.00

SOIL FERTILITY (1955)

C. E. Millar, Professor Emeritus of Soil Science, Michigan State College

A fundamental treatment of the principles of fertility in the soil, with major emphasis on the plant itself. Relevant aspects of soil chemistry, soil physics, soil microbiology and plant physiology from viewpoint of their influence on plant growth. Each major plant food element and the more important micro-nutrients fully treated with respect to supply in the soil, sources and amounts of additions, losses from the soil, functions in plant growth and plant symptoms of deficiency. Covers all sections, with considerable space to saline soils and soils of southern latitudes $6.75

CHEMISTRY OF THE SOIL (1955)

Firman E. Bear

Presents a comprehensive picture of the chemical aspects of soils in relation to their development, present constitution and the uses to which they are put. Covers: chemical composition, soil, colloids, organic matter relationships, oxidation-reduction phenomena, acid, alkaline and saline soils, plant nutrition, nutrient fixation, trace element chemistry, root and soil relationships. Scientists engaged in soil research will find useful data directly applicable to their investigations. Food chemists, manufacturers and those manufacturing liming materials, fertilizers, soil conditioners, surfactants, wetting agents, insecticides, fungicides and other agricultural chemicals will gain new ideas for future product research and development. 384 pages $8.75

SOIL PHYSICS—Third Edition (1956)

Dr. L. D. Baver, Director Experiment Station, Hawaiian Sugar Planters Association

This represents a considerable revision of the earlier versions and incorporates many ideas communicated to the author by soil scientists all over the world. Two new chapters on the principles of soil irrigation and drainage, discussion on soil puddlability, effect of chemical soil conditions on soil structure, and recent contributions of the diffusion process in soil aeration, and information on hydraulic conductivity, soil moisture stress and plant growth, the importance of compaction on soil tillage, and wind erosion processes. 489 pages $7.75

SOILS AND SOIL MANAGEMENT

A. F. Gustafson

A complete study of soils; physical properties, soil, organism, organic matter, relation of water, control of water, tillage, erosion, acidity and its control by liming, management of alkali soils, nitrogen and its importance to the farmer, production, conservation and utilization of farm manures, production and utilization of green manure crops; fertilizer materials and their effects on soils; crop rotations; fertilization and long-term maintenance of productivity of mineral soils. Published 1941. 424 pages, illustrated $6.50

SOIL SCIENCE SIMPLIFIED

Helmut Kohnke

A concise textbook dealing with basic concepts of soils. Much useful information for students in agriculture, farmers, fertilizer salesmen, etc. 68 pages, paper bound $1.00

IRRIGATED SOILS: Their Fertility and Management—New 1954—Second Edition

D. W. Thorne and H. B. Peterson, Department of Agronomy, Utah State Agricultural College. Dr. Thorne is also Chief of Soils and Fertilizer Research Branch, Tennessee Valley Authority

An outstanding text dealing with the problems of irrigated regions. In addition to the chapters dealing with irrigation, the salt problem, reclamation of saline and alkali soils, there are chapters on maintaining organic matter in soil, minerals and plant growth, fertilizer elements and fertilizer materials, using fertilizers, soil management for general field crops, for fruit, vegetable and specialty crops... $7.00

THE RESPONSE OF CROPS AND SOILS TO FERTILIZERS AND MANURES (1954)

W. B. Andrews

A new book, with special reference to Anhydrous Ammonia and other sources of nitrogen in liquid form. Deals also with legumes as a source of soil nitrogen, and the uncertainty of green manures; the response of soil to phosphorus, potash and soda; the effect of fertilizers on yield and feeding value of hay and pasture crops. 468 pages, 19 chapters, 89 illustrations $6.00

CHEMICALS, HUMUS AND THE SOIL

Donald P. Hopkins

The theme of the book is the necessity of chemical fertilizers to maintain the fertility of the soil. It has concise information on which soil conditions and which chemical fertilizers are most suited for special crops and vegetables. Space is devoted to cereal crops, barley, wheat, oats and rye; to roots and tubers, sugar beets, potatoes, carrots, parsnips and turnips; to vegetable crops, beans, peas, alfalfa, lupines; to grasses and clovers; to onions, flax, kale, cabbages, lettuce, tomatoes, celery, cauliflower and fruits. It clarifies the relationship of manures, compost and chemicals as fertilizers and points out how chemicals should be used to obtain the best results. Its philosophical soundness and logic should do much to avert the confusion of thought introduced by the advocates of compost and manure as against the use of chemical fertilizers..... $8.50

Order From Croplife

Reader Service Department
P.O. Box 67
Minneapolis 40, Minn.

(enclose remittance)

Southeastern Group Plans Conference in Atlanta

A program built around the dual theme of "Expanding the Fertilizer Market" and "Looking Ahead in Southern Agriculture," has been planned for the sixth Southeastern Fertilizer Conference scheduled to be held Oct. 5-6 at the Atlanta Biltmore Hotel, Atlanta, Ga.

Presiding at the opening session Oct. 5, will be G. A. Burson, Cotton Producers Assn., Atlanta. Expansion of the fertilizer market will be discussed from two angles, the advance program indicates. First will be a presentation on utilization of organized county programs and second, expanding the market with dealer education.

Scheduled to appear on the first portion of the program are Tom McCutcheon, Obion County agent, Union City, Tenn., and Tom McCabe, agent for Montgomery County, Ala.

The dealer education aspect of the matter will be discussed by Ralph Wehunt, TVA, Knoxville, Tenn.

Three speakers will center their remarks around the theme, "Looking Ahead in Southern Agriculture."

Dr. U. S. Jones, head of the department of agronomy, Clemson College, Clemson, S.C., will talk on "Research Points the Way."

Dr. E. T. York, director of the Federal Extension Service, Washington, D.C., has announced his subject as "The Changing Role of Extension."

Final speaker is W. R. Allstetter, vice president, National Plant Food Institute, Washington, D.C., whose topic is "The Industrial Revolution."

According to Dr. R. L. Beacher, director of the National Plant Food Institute's Southern Region, the Southern Extension Agronomists and Southern Soil Research Committees will convene in meetings Wednesday afternoon and Thursday morning, Oct. 4 and 5, in connection with the fertilizer conference.

Western Pesticide Group Plans October Convention

The situation of California agriculture generally and the specific responsibilities of the agricultural chemical industry will be subjects for discussion at the annual meeting of the Western Agricultural Chemicals Assn. scheduled to convene in the Claremont Hotel, Berkeley, Cal., Oct. 9-11.

Dr. George L. Mehrens, director of the Giannini Foundation of the University of California, will discuss "California's Agricultural Future" during the opening of the business sessions, Wednesday, Oct. 11. He will be followed by Louis A. Rozzoni, president of the California Farm Bureau Federation, Berkeley, and Charles Paul, director of the California State Department of Agriculture, Sacramento. Their subjects have not yet been announced.

L. B. McNelly, farm adviser of Santa Clara County, will complete the morning's program with a discussion on the subject: "Can We Be Complacent?"

Two afternoon speakers will include a representative of the industry, Dan J. Keating, general manager of the Agricultural Chemicals Division, Stauffer Chemical Co., New York, and Stuart W. Turner, consulting agrologist, San Francisco, on the subject: "Product Liability."

Frank McGrane, American Potash and Chemical Corp., San Francisco, is chairman of the golf tournament committee. Charles O. Barnard, executive secretary of the WACA, is in charge of convention plans and arrangements.

New Corporate Name

The Fluor Corporation, Ltd. has announced name and location changes for its New York engineering subsidiary, Singmaster & Breyer, Inc. The new name is "Fluor-Singmaster & Breyer, Inc." Incorporating as Singmaster & Breyer, Inc. in 1929, the firm affiliated with Fluor in 1954.

PLIABLE SCREW CONVEYOR—By building a conveyor housing of rubber-faced steel plate, maintenance costs on the above closed screw conveyor dropped to a negligible figure, according to Gates Rubber Co. which plated the conveyor. They claim that the resilence of the rubber facing prevented the accumulation of fertilizer dust which formerly would cake and pack until the steel screw would twist off. Formerly, the equipment had to be replaced every eight months, Gates says. The above conveyor has operated 16 hours a day for the past three years with no down-time for maintenance or repair.

SHRINKAGE

Continued from page 2

ted to the committee, plants producing granular fertilizers lose from 4% to 6% of the nitrogen; 2% to 4% of the phosphate, and 2% to 3½% of the potash input; whereas, the plants producing non-granular fertilizer lose from 1½% to 3% of their nitrogen; 2% to 3% phosphate and 2% to 3% of the potash input.

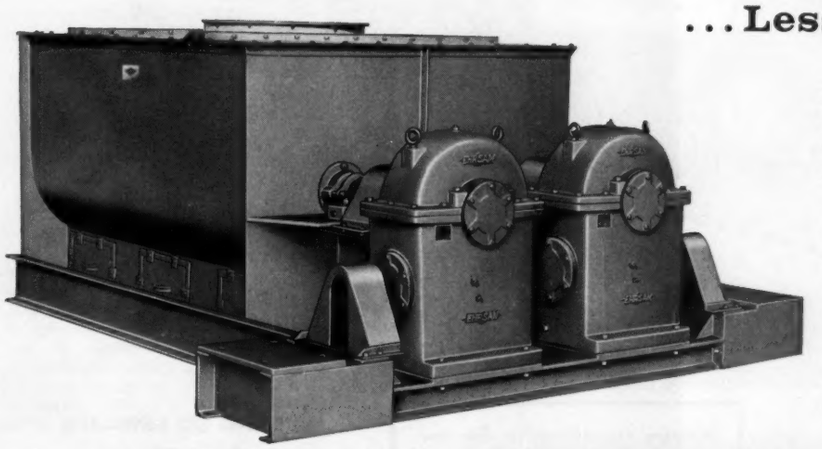
"Actually, granulation in this country is still comparatively new to most fertilizer manufacturers, and it can be expected that the more complicated a process becomes the more opportunity for shrinkage. . . . However, there is room for improvement, particularly in nitrogen recovery in the granular plants. Since the fertilizer industry is highly competitive, and no company can afford to overlook losses in any magnitude—the industry will show an over-all improvement."

The NPFI survey was made originally at the request of members who needed the information. A task force was organized under the chairmanship of Dr. Vincent Sauchelli, chemical technologist of NPFI. The group included J. E. Reynolds, Davison Chemical Co., Division, W. R. Grace & Co., Baltimore, Md.; M. D. Sanders, Swift & Co.; Rodger C. Smith, Eastern States Farmers' Exchange; Albert Spillman, Fertilizer Manufacturing Cooperative, Inc., Baltimore, Md.; Philip E. Stone, Virginia-Carolina Chemical Corp., and Dale C. Kieffer.

EHRSAM®

DOUBLE-BARREL MIXER

Increases Productivity ...Lessens Costly Downtime



The Ehrsam double-barrel paddle mixer writes its own ticket for economy and increased productivity as a fast, heavy-duty machine for the intensive blending of dry, powdered or granular materials.

Precision engineering and construction cut costly, annoying downtime. Steel plate mixing barrels, adjustable stuffing box seals, heavy-duty roller bearing pillow blocks are only a few of the stress points designed to withstand abusive, day-after-day operation.

Combined with a surge hopper, charging hopper with scales, Ehrsam will program an automatic charging, mixing, and discharge operation to your specifications.

20 TO 120 CUBIC-FOOT MODELS AVAILABLE

The J. B. EHRSAM & SONS MFG. COMPANY

Enterprise, Kansas

DISTRICT OFFICES

Kansas City, Kans. / Denver, Colo. / Chicago, Ill. / San Francisco, Calif. Fort Worth Tex. / Phoenix, Ariz. / Hastings, Neb. / Albuquerque, N. M.

EHRSAM Enterprise, Kansas

Please send new Ehrsam Mixer Catalog 8A. I am also interested in surge hoppers___; screw conveyors___; Dracon___; belt conveyors___; and bucket elevators___.

NAME_____

FIRM_____

ADDRESS_____

TOWN_____ STATE_____

E-M/2-661

"Aww, quit your beefing . . . I pushed you yesterday."

V-C Buys Interest in International Sulphur

Virginia-Carolina Chemical Corp., Richmond, Va., recently acquired a million shares of Texas International Sulphur Co., Houston. The V-C acquisition represents approximately a 20% interest in the sulphur firm.

As a provision of the purchase agreement, V-C will buy sulphur from a Mexican subsidiary of Texas International, Central Mineral S.A., and will furnish technical and management assistance to the Houston firm.

Three V-C officials will become members of International's board of directors. They are: Edward R. Adams, V-C vice president, finance; Douglas W. Laird, vice president, purchasing, and R. Daniel Smith, general counsel.

FOR FAST ACTION AND RESULTS try Croplife's CLASSIFIED ADVERTISING

Amchem Holds Field Day

More than 170 weed control specialists attended the 1961 weed and brush field day at Amchem Products Research Farm, Springhouse, Pa., July 25. Members of the research staff, including Robert H. Beatty, director, were on hand to explain the various projects under inspection. These included brush and soil sterilization experiments, turf tolerance plots, crab grass timing, corn and soybean weed and screening trials.

In addition to Mr. Beatty, Amchem officials on hand included G. C. Romig and Leon Cherksey, chairman of the board. Fred Slife, secretary of the Weed Society of America, was also introduced.

FUMIGATION SEMINAR

A fumigation seminar for field salesmen of The Dow Chemical Company's agricultural chemicals sales department was held in Houston, Texas, July 13-16. The four-day training program, in addition to formal classroom presentations, featured participation of the salesmen in the actual fumigation of both grain storage and milling facilities.

Mississippi Soil Fertility Council Meets

Members and guests of the Mississippi Soil Fertility and Plant Food Council were to gather at the Buena Vista Hotel in Biloxi Aug. 10-12 for their second annual convention.

Mike R. Blouin, Jr., council president, said this year's program was planned to deal with practical problems relating to the use of fertilizer on Mississippi's soils and for Mississippi crops.

The meeting was to begin Aug. 10 with presentations of soil testing and cotton, corn, soybean and pasture fertilization by members of the Extension Agronomy staff at Mississippi State University. This was to be followed by a demonstration on fertilizer and an open discussion on the recently-initiated Mississippi Soil Fertility Program.

Speakers scheduled to appear included Frank J. Welch, assistant secretary of agriculture; A. P. Gates, vice president, Virginia - Carolina Chemical Corp., Richmond, Va., and R. E. Spivey, Jr., assistant to the president, Federal Intermediate Credit Bank of New Orleans.

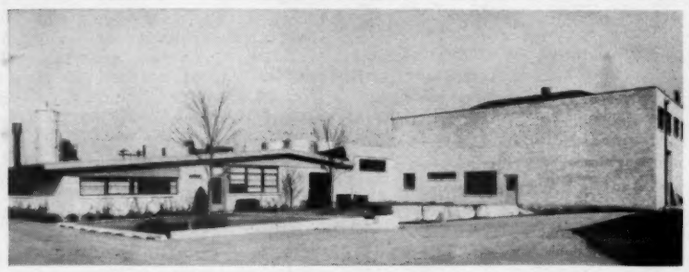
New Herbicide Study

The fourth annual survey of farmers' purchases and applications of herbicides being conducted by the Marketing Research Division, Doane Agricultural Service, Inc., St. Louis, Mo., will be available this fall, Doane has announced.

These annual studies of chemical weed killer usage in the United States are conducted through the Doane countrywide farm panel, a cross section of commercial farmers.

Thiodan Label Cleared

New label claims for the use of Thiodan® insecticide on sugar beets have been accepted by the U.S. Department of Agriculture, Niagara Chemical Division of FMC Corp. has announced. The chemical can now be used to control webworm and green peach aphid.

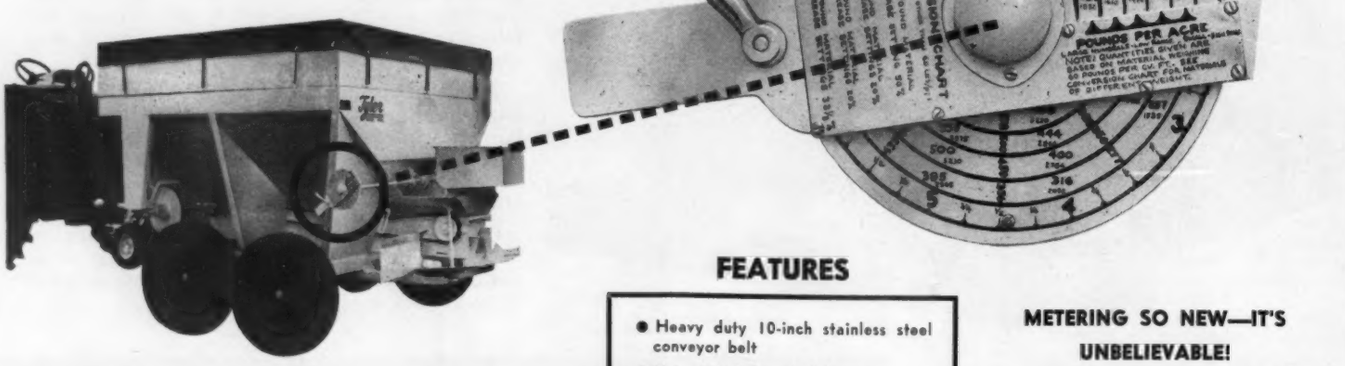


NEW FACILITIES—Hodag Chemical Corp., Skokie, Ill., has announced completion of a new two-level building and installation of new automatic equipment which the firm says will double its production of surface-active chemicals. According to Sheldon E. Kent, president, the new facilities are the third major plant expansion for the company since its founding in 1954. Hodag manufactures emulsifiers and other surface-active products for the chemical processing industry.

Every once in awhile a good idea comes along in any business—and a year ago it happened in the fertilizer industry when TYLER introduced the F2 Tractor Spreader and with it a new system of fertilizer application. Common sense engineering and practical merchandising has put hundreds of F2's in the field with excellent customer acceptance—and they're DOING THE JOB!

*DIAL-A-MATIC® By Tyler

*One of many new features found on the Tyler F2-B Tractor Spreader.



For descriptive literature and full information, write or call

FEATURES

- Heavy duty 10-inch stainless steel conveyor belt
- Rugged tubular steel frame
- Angled metering gate for smooth material flow
- Up to four-ton capacity

METERING SO NEW—IT'S UNBELIEVABLE!

In this jet age of missles and speed, it's a survival of the fittest . . . super mechanization and careful and precise engineering to produce products that will perform in the best way possible. TYLER introduces the Model F2-B — DIAL-A-MATIC SPREADER—A TOUGH MACHINE BUILT FOR A TOUGH JOB!

Tyler MANUFACTURING COMPANY
East Highway 12 Benson, Minn.
Phone Viking 2-8581

MOVING AHEAD

Continued from page 37

Buell and its Northern Blower Division in Cleveland, Ohio.

The appointment of **Jan Platou** as information specialist in its European office was recently announced by The Sulphur Institute. Mr. Platou, a native of Norway, will join The Institute on September 1, and will be located in London, England. He will have responsibility in Europe for technical information services in support of The Institute's research and educational programs relating to agricultural and industrial uses of sulphur.

●

Robert B. Newman has been named vice president—director of sales of Vulcan Containers, Inc., Bellwood, Ill., according to an announcement by **Gordon D. Zuck,** president of Vulcan-Associated Container Companies, Inc.

Robert B. Newman

Mr. Newman is a graduate of the Illinois Institute of Technology, and attended the University of Michigan Business Administration and Engineering Schools.

For over twelve years he served in executive capacities in the steel industry. In 1959 he joined Vulcan-Associated Container Companies, Inc. at Birmingham, Ala. and served as assistant to the president.

●

Edward L. Hankins' promotion to manager of manufacturing for Fulton Cotton Mills, Atlanta, Ga. has been announced by **Clarence E. Elsas,** president. Mr. Hankins will supervise the cotton mills, finishing plants, engineering, warehousing and shipping departments.

●

Adrian H. Van Kampen, controller-chemical industries, Armour & Co., has been elected vice president of the Chicago Control of the Controllers Institute of America, and **Edward R. Adams,** vice president-finance, Virginia-Carolina Chemical Corp., was named treasurer.

●

J. T. Braxtan, assistant secretary of the Bemis Bro. Bag Co., has been elected secretary of the company, it was announced following a recent meeting of the board of directors.

J. T. Braxton

Mr. Braxtan succeeds **Ronald Ramsay,** who retired July 31 after 35 years with Bemis. Mr. Braxtan was elected assistant secretary in February, 1960. He has been with Bemis since 1934.

●

Appointments of **George R. Jacobus** and **Wayne W. Moran,** as sales representatives for Southern Bag Corp., Yazoo City, Miss., have been announced by **Julius Griggs,** sales manager. Mr. Jacobus will be located in Atlanta, Ga., and Mr. Moran at New Orleans, La.

●

Vulcan Steel Container Co., Birmingham, Ala., has announced the appointment of **John C. Rheay** as a sales representative. **Gordon D. Zuck,** president, says Mr. Rheay will serve the State of Florida.

Dorcon, Inc., Subsidiary Of Dorr-Oliver, Formed

Dorcon Inc., wholly-owned subsidiary of Dorr-Oliver Inc., Stamford, Conn., is being formed to engage in the design, manufacture, fabrication and field erection of metal tanks, water and chemical storage facilities, and process and reaction vessels.

Officers of the new company will be Alex Fino, president; K. Earl Abel, treasurer; John W. Swick, secretary. Administrative and engineering offices will be at Warren, Pa., and sales headquarters in Pittsburgh, Pa., with Max G. Walker as sales manager.

Dorr-Oliver says the addition of Dorcon to its group of companies will provide a specialized engineering organization in connection with various Dorr-Oliver equipment and process and plant engineering operations. In addition, the new company will manufacture, erect, and market a complete line of steel plate, alloy and aluminum tanks and vessels.

New Headquarters for Bemis Subsidiary

Full-scale operations of Packaging Frontiers, Inc., producers of the new Ultra-Pak packaging system, were expected to begin soon, the company announced upon the recent completion of its new headquarters building at Waltham, Mass.

Paul L. Wheeler, Packaging Frontiers president, said full occupancy of the one-story, 10,000-square-foot headquarters was accomplished by Aug. 1.

Packaging Frontiers is a subsidiary of Bemis Bro. Bag Co., formed last January, when Bemis acquired exclusive worldwide patent rights to the Ultra-Pak package and to the machine for operating it.

STIMULATING KILLER

Tests by the University of Illinois show that 2,4-D and similar weed-killing chemicals may also be used some day to boost crop growth and yields. The application of minute amounts of these chemicals—about 1 lb. per 1,000 acres—increased yields of the common bean more than 10% above average in the Illinois tests. Joe Vandemark, vegetable crop specialist of the University of Illinois, says the amount and time of application are important in using weed killers as growth stimulators. The amount of spray left in a spray can after it is washed, he says, is more than enough to treat one acre. The Illinois tests on this are continuing to determine whether or not a practical use for this new technique can be developed.

*Trade Mark

OPENING

How fast can you swing your arm?

That's how fast you can open a Bemis Multiwall with Bemi-Strip closure. Just grab the red tab and pull. The bag opens quickly, easily.

A tight seal . . . yet a fast, economical opening that leaves the bag intact.

No fumbling for thread ends. No cutting. No stuck closure seams. And no paper shreds or thread clippings, so . . . assured cleanliness.

Ask your Bemis man for complete information.

BEMIS BRO. BAG CO.

where packaging ideas are born

General Offices—408 Pine St., Box 100, St. Louis 2 • Sales Offices in Principal Cities

Croplife®
A BUSINESS PAPER FOR THE FARM CHEMICAL INDUSTRY

Pesticide Trade Involved . . .

Possibility of Biological Assault Against U.S. Agriculture Regarded as Real Threat

THE PESTICIDE trade, including manufacturers and researchers, should keep in mind an eventual possible call for widespread distribution of insecticides and fungicides in the event of enemy action in the form of biological warfare. That such a development is possible, is well known by entomologists and crop scientists who have done more than a little speculating and study on the application of biological principles as a potent weapon in case the U.S. should be in need of such.

It is reasoned that if scientists in the U.S. have developed ways in which crops in hostile lands might be either destroyed or greatly reduced by the introduction of insect pests, or wheat rust spores, for example, it is pretty certain that the Russians and their captive scientists have also done some serious pondering on the same idea. The very fact that U.S. agriculture is so productive, makes it an attractive target for the type of biological monkey-business likely to be conjured up by Soviet planners.

The ease with which anti-crop warfare could be launched secretly by saboteurs in the U.S. is not difficult to imagine. Should such an event happen, there would arise the question of whether the infestation of bugs or epidemic of some disease were natural ocurrences, or whether through action of enemy agents. If we suspected it were caused by the latter, then the question would come up about retaliation . . . whom could we accuse, lacking positive evidence. And should retaliation be in the form of biological weapons, or thermonuclear, and against whom?

The portent of these queries can cause one to squirm uneasily, particularly in view of some of the goings-on in neighboring countries and in other areas of the world. It is known that Red scientists are very knowledgeable in the techniques of biological assaults, and it could be that they are employing such weapons this summer in Latin America, Africa, Turkey and Pakistan. All of these countries have had agricultural difficulties (which is not particularly new to them). From Russia's standpoint, such a situation in each country creates economic distress which in turn provides a favorable climate for the Red line.

In commenting on the situation in a recent issue, the Wall Street Journal points out that there have been mysterious new outbreaks of plant and animal diseases around the globe in recent months, along with persistant attacks by longer-established pests. These events have come sharply to the attention of U.S. researchers familiar with the tactics of biological warfare.

"African horse sickness, a malady that suddenly appeared in 1959 in the Middle East and elsewhere in Asia, already has destroyed an estimated 170,000 animals in these areas and is still unchecked. Parasitic cattle ticks and disease-ridden flies are causing unusually high losses of hides, beef and milk in Central and South America. Armies of locusts, caterpillars and crickets are ravaging crops in pro-Western Pakistan," the Journal reports.

While there is no evidence to show that any of these outbreaks have been caused deliberately, on the other hand, there is likewise no proof that they were of accidental nature.

There are strong hints available about how the Soviets feel about use of such weapons. A newly-translated volume entitled "Biological Warfare," now being circulated in top Soviet circles, carries some potent points. The authors, a pair of Polish scientists, discuss various crop diseases: "It is possible—at least theoretically," they say, "to vanquish even a very strong foe, without killing people and animals and without destroying villages, cities and enterprises, by using against him a sufficiently effective means which attacks plants at the right moment."

The authors then make this point:

"In the United States alone, the destruction of grain and other agricultural crops causes an annual damage to agriculture estimated at billions of dollars. But all this is 'peaceful' action—diseases and pests of agricultural plants spreading spontaneously. What would happen then," the Red scientists wonder, "if similar factors were deliberately used under military conditions?"

It is not difficult to imagine the answer to their question. Wheat specialists, for example, are watching for the possible presence of a virulent type of wheat rust now in South America, which could devastate millions of acres of wheat in the U.S. Given favorable weather conditions, spores of this rust sprinkled in only a few fields in northern Mexico or in Texas, could be swept northward on prevailing south-north winds across the Great Plains wheat area, completely across the U.S. and into Canada.

No one has ever come up with the full answer about how the destructive wheat rust, 15B got started in this country. In 1953, many industry people will recall, this disease destroyed more than 325 million bu. of grain estimated at $500 million.

There is virtually no end to races of wheat rust, as plant pathologists well know. More than 300 kinds are catalogued, but beyond these are possible artificial ones which presumably could have been concocted by Iron Curtain scientists.

But the U.S. is not unaware of these possibilities and is making moves toward meeting any eventuality. Such work is reportedly not only defensive, but we, too, have discovered ways of destroying enemy crops . . . particularly means of laying waste millions of acres of wheat, rice and potatoes, chief staples in many Communist lands. Naturally, we do not expect to use these weapons except in retaliation or in actual warfare.

Meanwhile, the U.S. pesticide industry, its scientists and its distribution setup are all important links in a chain of action that might be needed some day. When (or if) such action is needed, the industry will be prepared to provide the necessary goods . . . just as it does each season to control "normal" infestations of insects and occurrences of plant diseases in crops.

Croplife's Home Office

Croplife®

BPA — *Member of Business Publications Audit*

NBP — *Member of National Business Publications*

Lawrence A. Long, Editor
Donald Neth, Managing Editor

John Cipperly, Washington Correspondent

ADVERTISING STAFF—Wayne M. Soule, Advertising Sales Manager; Carl R. Vetter, Advertising Department Manager; Bruce A. Kirkpatrick, Advertising Production Manager; Jerome C. Whiting, Assistant Advertising Production Manager; R. Dale Swenson, Promotion Manager; Lester L. Metz, Marketing and Research Director.

BUSINESS STAFF—Milton B. Kihlstrum, President; Wilfred E. Lingren, Executive Vice President; Don E. Rogers, Vice President; Paul L. Dittemore, Vice President; Donald Neth, Secretary; Norman Couper, Treasurer and Controller; James G. Pattridge, Assistant Treasurer; Harry M. Dunn, Jr., Circulation Fulfillment Manager; Richard Ostlund, Office Manager; Walter O. Buchkosky, Production Superintendent.

ADVERTISING REPRESENTATIVES

EASTERN STATES—Paul L. Dittemore, Manager; Archy S. Booker, Jr., and James W. Miller, Advertising Sales Representatives; Room 1101, 52 Vanderbilt Ave., New York 17, N.Y. (Tel. Oregon 9-2490).

CENTRAL STATES—Don E. Rogers, Manager; Amos W. Standish and Robert M. Harrison, Advertising Sales Representatives; 2832 Board of Trade Bldg., 141 W. Jackson Blvd., Chicago 4, Ill. (Tel. Harrison 7-0515).

SOUTHWEST—Martin E. Newell, Manager; Thomas E. Letch, Assistant Manager; 612 Board of Trade Bldg., Kansas City 5, Mo. (Tel. Victor 2-1350).

NORTHWEST—Wayne M. Soule and Paul A. Anderson, Advertising Sales Representatives, P.O. Box 67, Minneapolis 40, Minn. (Tel. Franklin 4-5200).

WASHINGTON CORRESPONDENT — John Cipperly, 604 Hibbs Bldg., Washington, D. C. (Tel. Republic 7-8534).

WESTERN STATES — The Maurice A. Kimball Co., Inc., 2550 Beverly Blvd., Los Angeles 57, Cal. (Tel. Dunkirk 8-6178); The Maurice A. Kimball Co., Inc., 681 Market St., San Francisco 5, Cal. (Tel. Exbrook 2-3365).

EXECUTIVE AND EDITORIAL OFFICES — 2501 Wayzata Blvd., Minneapolis, Minn. Tel. Franklin 4-5200. Bell System Teletype Service at Minneapolis (MP 179), Kansas City (KC 295), Chicago (CG 340), New York (NY 1-2452), Washington, D.C. (WA 82).

Published by

THE MILLER PUBLISHING CO.

2501 Wayzata Blvd., Minneapolis, Minn.
(Address Mail to P. O. Box 67, Minneapolis 40, Minn.)

Associated Publications—The Northwestern Miller, Farm Store Merchandising, Feedstuffs, Feedlot, Professional Nursing Home

Aug. 16-20—Canadian Fertilizer Assn. annual convention, Manoir Richelieu, Murray Bay, Quebec. R. P. Pennington, 2 Carlton St., Toronto 2, Ont., secretary-treasurer.

Aug. 27-30—Annual meeting of American Society for Horticultural Science, Purdue University, Lafayette, Ind.

Sept. 6-8 — Rocky Mountain Plant Food Assn., Silver Streams Lodge, Rt. 1, Bayfield, Colo. (Fifteen miles north of Bayfield at Vallecito Lake.)

Sept. 10-13—Farm Equipment Institute, 68th annual convention, Palmer House, Chicago.

Sept. 10-14—National Assn. of County Agricultural Agents, 46th annual meeting, Waldorf-Astoria Hotel, New York.

Sept. 17-20 — Canadian Agricultural Chemicals Assn., 9th annual meeting and conference, Mont Tremblant Lodge, Mont Tremblant, Quebec.

Sept. 24-27—American Institute of Chemical Engineers, 46th national meeting, Lake Placid Club, Lake Placid, N.Y.

Oct. 5-6—Sixth Southeastern Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 9-10—Third Annual Agricultural Chemical Applicators' Conference for the Pacific Northwest, Chinook Hotel, Yakima, Wash.

Oct. 9-11—Western Agricultural Chemicals Assn., annual meeting, Hotel Claremont, Berkeley, Cal.

Oct. 12-13 — Northeastern Fertilizer Conference, Chicopee, Mass.

Oct. 16-20 — Fertilizer Section, National Safety Council, annual meeting, Pick-Congress Hotel, Chicago.

Oct. 25—Annual Conference on Chemical Control Problems, sponsored by National Plant Food Institute, Woodner Hotel, Washington, D.C.

Oct. 25-26—Association of American Fertilizer Control Officials, 15th annual convention, Woodner Hotel, Washington, D.C.

Oct. 29-Nov. 1—National Agricultural Chemicals Assn., 28th annual meeting, Homestead Hotel, Hot Springs, Va.

Oct. 30-Nov. 1—Fertilizer Solutions Assn. annual convention, Edgewater Beach Hotel, Chicago, Ill.

Nov. 2-3 — Pacific Northwest Plant Food Assn. annual convention, Hotel Gearhart, Gearhart, Oregon.

Nov. 7-10—Packaging Machinery Manufacturers' Institute Show of 1961, Cobo Hall, Detroit, Mich.

Nov. 12-14 — California Fertilizer Assn., thirty-eighth annual convention; Jack Tar Hotel, San Francisco.

Nov. 21-24—Mexican Assn. of Insecticide and Fertilizer Manufacturers, Hotel La Perla, La Paz, Lower California, Mexico.

Nov. 27-30—Entomological Society of America, annual meeting, Miami, Fla.

Nov. 27-30—American Society of Agronomy annual meeting, with Soil Science and Crop Science Societies included, Sheraton-Jefferson Hotel, St. Louis, Mo.

Dec. 11-14—Weed Society of America, annual meeting. Sheraton-Jefferson Hotel, St. Louis, Mo.

Dec. 14-15—Ohio State Fertilizer and Lime Conference, Agricultural Administration Building, Ohio State University.

1962

Jan. 10-12 — Agricultural Ammonia Institute, eleventh annual convention, Sheraton-Jefferson Hotel, St. Louis, Mo.

Jan. 17-19, 1962 — Southern Weed Conference, Hotel Patten, Chattanooga, Tenn.; Dr. R. E. Frans, Dept. of Agronomy, University of Arkansas, Fayetteville, secretary-treasurer.

Jan. 18-19—Southern Farm Forum, 15th annual meeting, Roosevelt Hotel, New Orleans, La.

Jan. 25-27 — Agricultural Aircraft Assn., 12th annual convention, Hotel El Mirador, Palm Springs, Cal.

Feb. 12-13—Short Course on Fertilizer Technology, sponsored by Soil Science Society of America, Purdue University.

Feb. 15-16—Joint Meeting of Midwestern Agronomists and Fertilizer Industry Representatives, annual meeting sponsored by National Plant Food Institute, Edgewater Beach Hotel, Chicago.

March 13-14—Symposium on Packaging of Chemical Products, sponsored by Manufacturing Chemists' Assn., Chase-Park Plaza Hotels, St. Louis, Mo.

June 26-28—Pacific Branch, Entomological Society of America, Villa Hotel, San Mateo, Cal.

CALENDAR FOR 1961-62

AUGUST

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

SEPTEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

NOVEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

DECEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

JANUARY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

FEBRUARY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28			

MARCH

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

APRIL

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

MAY

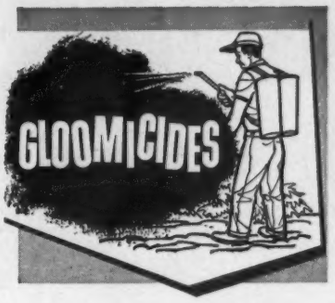
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

JUNE

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

JULY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				



At a party celebration in Leningrad, a guest found a piece of rubber tire in his stew. About to complain, he noticed a secret-police official watching him. "Well, everything is going according to our calculations," he said. "Here we've been in power only 35 years and already the automobile is replacing the horse."

●

The meek little gent in the restaurant finally sighed and decided to give up on his steak. It was tougher than shoe leather. He called the waiter and pleaded that it be taken back to the kitchen. The waiter shook his head and said: "Sorry, pal, I can't take it back now. You've bent it."

●

Sign on a Scottish golf course: "Members will kindly refrain from picking up lost balls until they have stopped rolling."

●

When the motorist who crashed into a telephone pole and brought down the wires recovered consciousness, his hands were clutching the wire. "Thank Heaven," he exclaimed fervently, "it's a harp."

●

First Scientist: I still can't figure how the ancient Egyptians managed to build the pyramids.

Second Scientist: Well, for one thing, they didn't have coffee breaks.

●

"Why don't you marry me?" he pleaded. "Is there someone else?"

"Oh, John," she sighed, "there must be!"

●

The sick Russian heard a knock on the door. "Who's there?"

"Death," answered a sepulchral voice.

"Thank God. I thought it was the secret police."

INDEX OF ADVERTISERS

The index of advertisers is provided as a service to readers and advertisers. The publisher does not assume any liability for errors or omissions.

Allied Chemical Corp., Nitrogen Div.	21-24
American Cyanamid Co.	33
American Oil Co.	19
Ashcraft-Wilkinson Co.	28, 44
Baughman Mfg.	34
Bemis Bro. Bag Co.	41
Continental Sales Co.	36
Ehrsam & Sons Mfg. Co., The	39
Ferro Corp.	31
Henderson Mfg. Co.	26
Hough, Frank G., Co.	37
International Minerals & Chemical Corp.	4, 5
Molded Fiberglass Body Co.	30
Phelps-Dodge Refining Corp.	8
Phillips Chemical Co., a subsidiary of Phillips Petroleum Co.	35
Potash Company of America	17
St. Regis Paper Co.	15
Simonsen Mfg. Co.	25
Southwest Potash Corp.	20
Spraying Systems Co.	32
Tennessee Corp.	16
Texas Gulf Sulphur Co.	9
Tyler Mfg. Co.	40
Union Bag-Camp Paper Corp.	11
U. S. Borax & Chem. Corp.	13, 27
U. S. Steel Corp.	3
Victor Chemical Works	29

Classified Ads

Classified advertisements accepted until the fifth of each month for that month's issue.

Rates: 20¢ per word; minimum charge $3.00. Situations wanted, 15¢ a word; $2.25 minimum. Count six words of signature, whether for direct reply or keyed care this office. If advertisement is keyed, care of this office, 25¢ per insertion additional charged for forwarding replies. Commercial advertising not accepted in classified advertising department. Display advertising accepted for insertion at minimum rate of $12 per column inch.

All Want Ads cash with order.

SITUATIONS WANTED

CHALLENGING OPPORTUNITY FOR growth with progressive company desired by aggressive sales manager with 12 years experience in sales and marketing of farm and specialty plant food. College graduate. Married. Prefer Midwest or South. Address Ad No. 7148, Croplife, Minneapolis 40, Minn.

UNIVERSITY TRAINED AGRICULTURIST with over 15 years' sales experience desires sales position western U.S. (will travel). Address Ad No. 7071, Croplife, Minneapolis 40, Minn.

MACHINERY FOR SALE

FOR SALE—1958 NEW LEADER SPREADER box, 12 ft. for fertilizer or lime, mounted on 1958, 170 International truck, tandem drive, brownie split shift transmission, and locking rear axle. Ready to go. Write Box 855, Mankato, Minn.

ALUMINUM TANKS (2), 42,000 GAL. CAP., bolted type, 30x8 ft., excellent condition, attractively priced. L. E. Glick & Co., 626 Broadway, Cincinnati 2, Ohio.

CENCO MOISTURE METER, SLIGHTLY used, like new. Write or call Tri State Fertilizer Co., P.O. Box 884, Burlington, Iowa; Phone Plaza 4-7547.

MACHINERY WANTED

WANTED TO BUY—USED MACHINERY. One 1 ton Stedman mixer or equivalent, one 20x12 Stedman pulverizer, 18 inch troughing conveyors and bucket elevators. Send data and price to P.O. Box 417, East Grand Forks, Minn.

HELP WANTED

PLANT SUPERINTENDENT FOR PEL-leted fertilizer plant. Must be qualified to formulate, supervise, and process bagging, shipping and all other functions required of this type operation. Send resumé, including educational background, work experience and salary requirement. Address Ad No. 7037, Croplife, Minneapolis 40, Minn.

AGRICULTURAL ENGINEER
JAMAICA, B.W.I.

Large American mining corporation has extensive farming operations in Jamaica. Immediate opening for young but mature recent graduate in agricultural engineering to work under farm manager. Operations include cattle and crop raising. Prefer married man with no school age children. Write immediately for more information giving complete details on age, education and experience.

Address Ad No. 7028, Croplife
Minneapolis 40, Minn.

Extension Man Dies

Robert L. Guice, 43, soil conservationist with the New Mexico State University extension service, died suddenly July 18 at East Lansing, Mich. He had been on educational leave since May 1 as a graduate student at Michigan State University, where he was to receive a master's degree this summer.

Spider Mite Control

Geigy Agricultural Chemicals, division of Geigy Chemical Corp., Ardsley, N.Y., has announced that Chlorobenzilate miticide has been approved for control of spider mites on cotton. These pests include Atlantic, European red, Pacific, Schoene, and two-spotted spider mites. The product is said to be effective against mites in all growth stages.

AN IMPORTANT ANNOUNCEMENT FROM ESCAMBIA CHEMICAL CORPORATION

The sale of all nitrogen products produced by Escambia Chemical Corporation is now being handled by our own sales force.

To provide the finest possible service and assistance to our customers, our Atlanta branch has moved into larger quarters and the staff has been greatly expanded. Additionally, Escambia sales representatives are now located throughout the marketing area.

For quality nitrogen products, service you can count on, and skilled technical assistance, call on Escambia.

JAMES A. HUNTER
Sales Manager
Nitrogen Products

FRED C. BROADWAY
Division Sales Manager
Montgomery, Alabama

JAMES H. PAUL
Product Manager
Fertilizer Raw Materials and
Solid Ammonium Nitrate

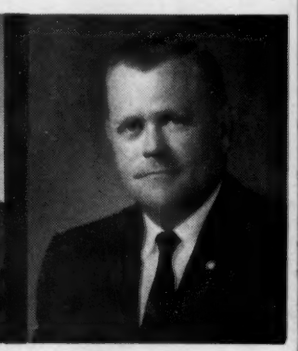
ROLAND C. RAYBURN
Product Manager
DA Solutions and Ammonia

RALPH F. ALLEN
Sales Representative
Florida

RUDOLPH J. CHILDRE
Sales Representative
Southwest Georgia and
West Florida

ROBERT M. HARDING
Sales Representative
Mississippi, Arkansas,
Louisiana, Tennessee

JAMES M. SULLIVAN
Sales Representative
South Alabama and
Western Florida



JAMES A. BENTLEY
Sales Correspondent
Atlanta

NITROGEN SALES OFFICE

Escambia Chemical Corporation

3330 PEACHTREE ROAD, N.W., ATLANTA 5, GEORGIA • PHONE: 237-2246

PRODUCERS OF: **AMMO-NITE®**—PRILLED AMMONIUM NITRATE OR SOLUTIONS **BAYSOL®** NITROGEN SOLUTIONS AND ANHYDROUS AMMONIA